tDS-700 Series

User Manual

Ver.1.8.2

Tiny Serial-to-Ethernet Device Server

WARRANTY

All products manufactured by ICP DAS are warranted against defective materials for a period of one year from the date of delivery to the original purchaser.

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CONTACT US

If you have any questions, please feel free to contact us via email at:

service@icpdas.com, service.icpdas@gmail.com

SUPPORT

This manual relates to the following modules:

tDS-712, tDS-722, tDS-732

tDS-715, tDS-725, tDS735

tDS-718, tDS-724, tDS-734

tDS-715i

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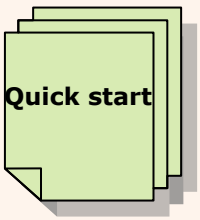
Packing List

The shipping package includes the following items:

- ☑ One tDS-700 series hardware module
- ☑ One printed Quick Start Guide
- ☑ One software utility CD



Note:

If any of these items are missing or damaged, please contact the local distributor for more information. Save the shipping materials and cartons in case you need to ship the module in the future.

More Information

Documentation

CD:\NAPDOS\tDS-700\Document

http://ftp.icpdas.com/pub/cd/tinymodules/napdos/tds-700/document/

Firmware

CD:\NAPDOS\tDS-700\Firmware

http://ftp.icpdas.com/pub/cd/tinymodules/napdos/tds-700/firmware/

Software

CD:\NAPDOS\Software

http://ftp.icpdas.com/pub/cd/tinymodules/napdos/software/

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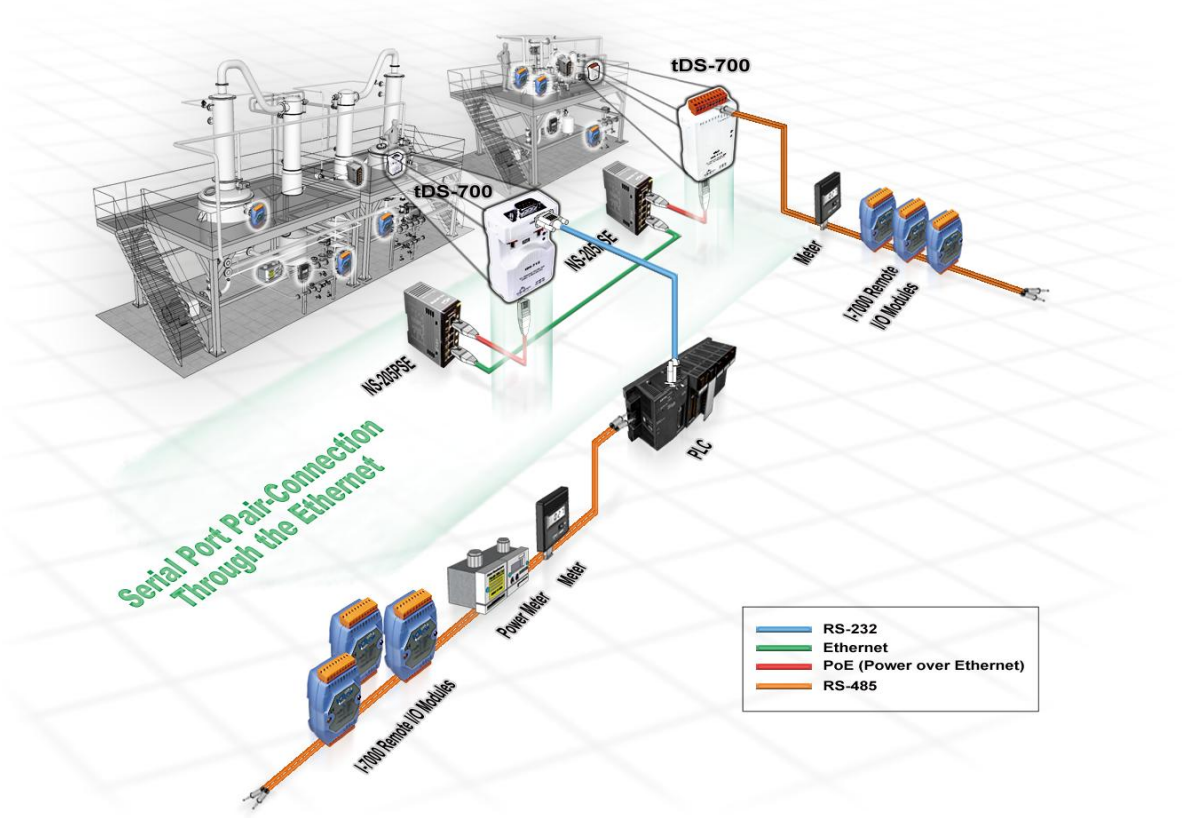
1. Introduction

The tDS-700 is a series of Serial-to-Ethernet device servers that are designed to add Ethernet and Internet connectivity to any RS-232 and RS-422/485 device, and to eliminate the cable length limitation of legacy serial communications. By using the VxComm Driver/Utility, the built-in COM Port of the tDS-700 series can be virtualized to a standard PC COM Port in Windows. Therefore, users can transparently access or monitor serial devices over the Internet/Ethernet without the need for software modification.

tDS-700 device servers can be used to create a pair-connection application (as well as serial-bridge or serial-tunnel), and then route data between two serial devices via TCP/IP. This is useful when connecting mainframe computers, servers or other serial devices that do not themselves have Ethernet capability. By virtue of its protocol independence and flexibility, the tDS-700 meets the demands of virtually any network-enabled application.



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In harsh industrial environments, the tDS-700 series (for i version) also adds 2500 V_{DC} and +/- 4 kV ESD protection component that diverts the potentially damaging charge away from sensitive circuit to protects the module and equipment from the sudden and momentary electric current.

To achieve maximum space savings, the tDS-700 is offered in an amazingly small form-factor that enables it to be easily installed anywhere, even directly attached to a serial device or embedded into a machine. The tDS-700 features a powerful 32-bit MCU that allows it to efficiently handle network traffic. The tDS-700 offers true IEEE 802.3af-compliant (classification, Class 1) Power-over-Ethernet (PoE) functionality using a standard category 5 Ethernet cable that allows it to receive power from a PoE switch such as the NS-205PSE. If there is no PoE switch available on site, the tDS-700 can accepts power input from a DC adapter.

Comparison of Device Servers:

Series / Features	PPDS	PDS	DS	tDS	tGW
Virtual COM	Yes	Yes	Yes	Yes	-
Programmable	Yes	Yes	-	-	-
PoE	Yes	-	-	Yes	Yes
Modbus Gateway	Yes	-	-	-	Yes
Multi-client	About 20 Sockets			1 Sockets/Port	10 Sockets/Port
Remarks	Professional	Powerful	Isolation for DS-715	Cost-effective, Entry-level	Cost-effective, Entry-level

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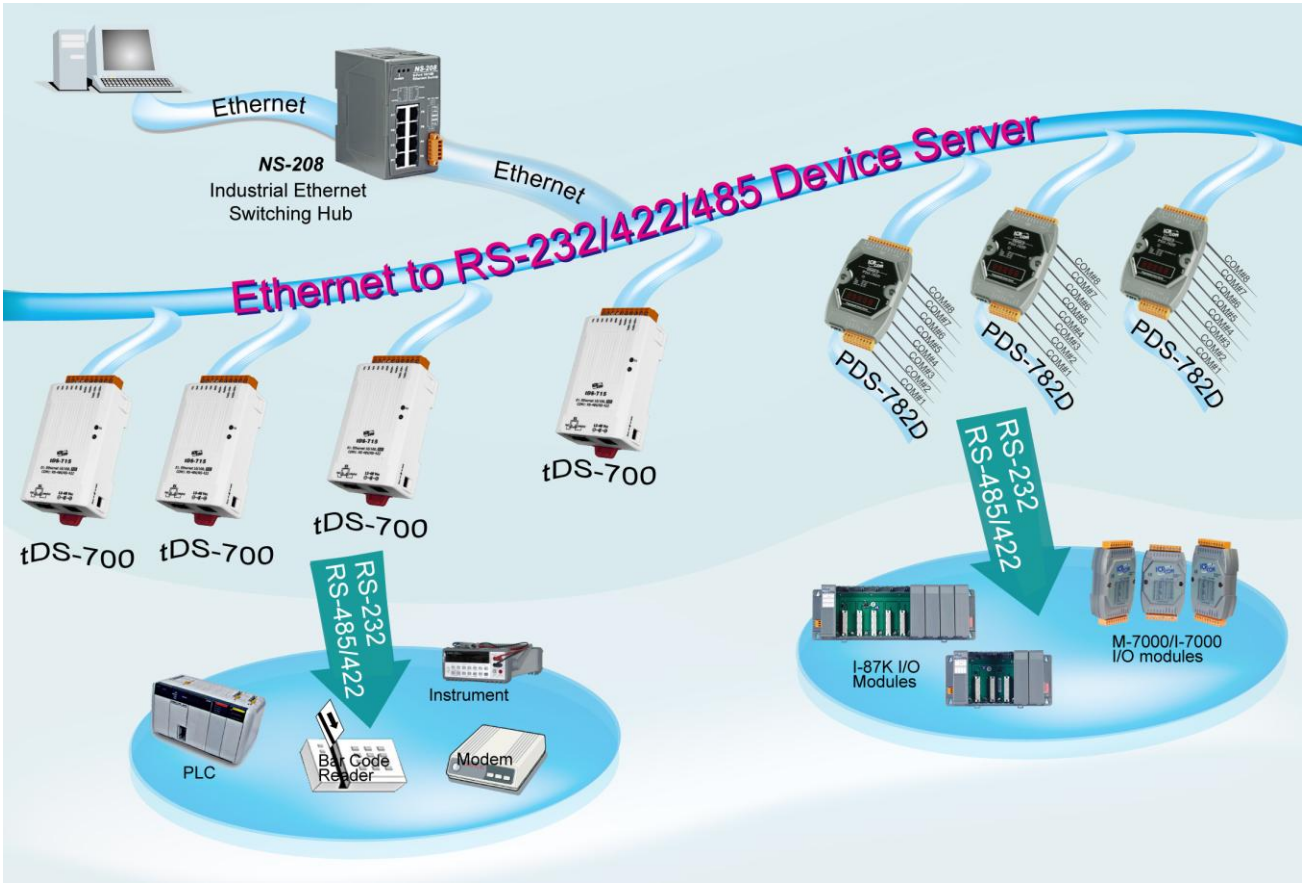
1.1 Ethernet Solutions

Nowadays, the Ethernet protocol has become the foremost standard for local area networks. Connectivity via the Internet is now common in many of the latest applications from home appliances, to vending machines, to testing equipment, to UPS, etc. An Ethernet network can link office automation and industrial control networks, access remote systems and share data and information between machines from multiple vendors, and also provides a cost-effective solution for industrial control networks.



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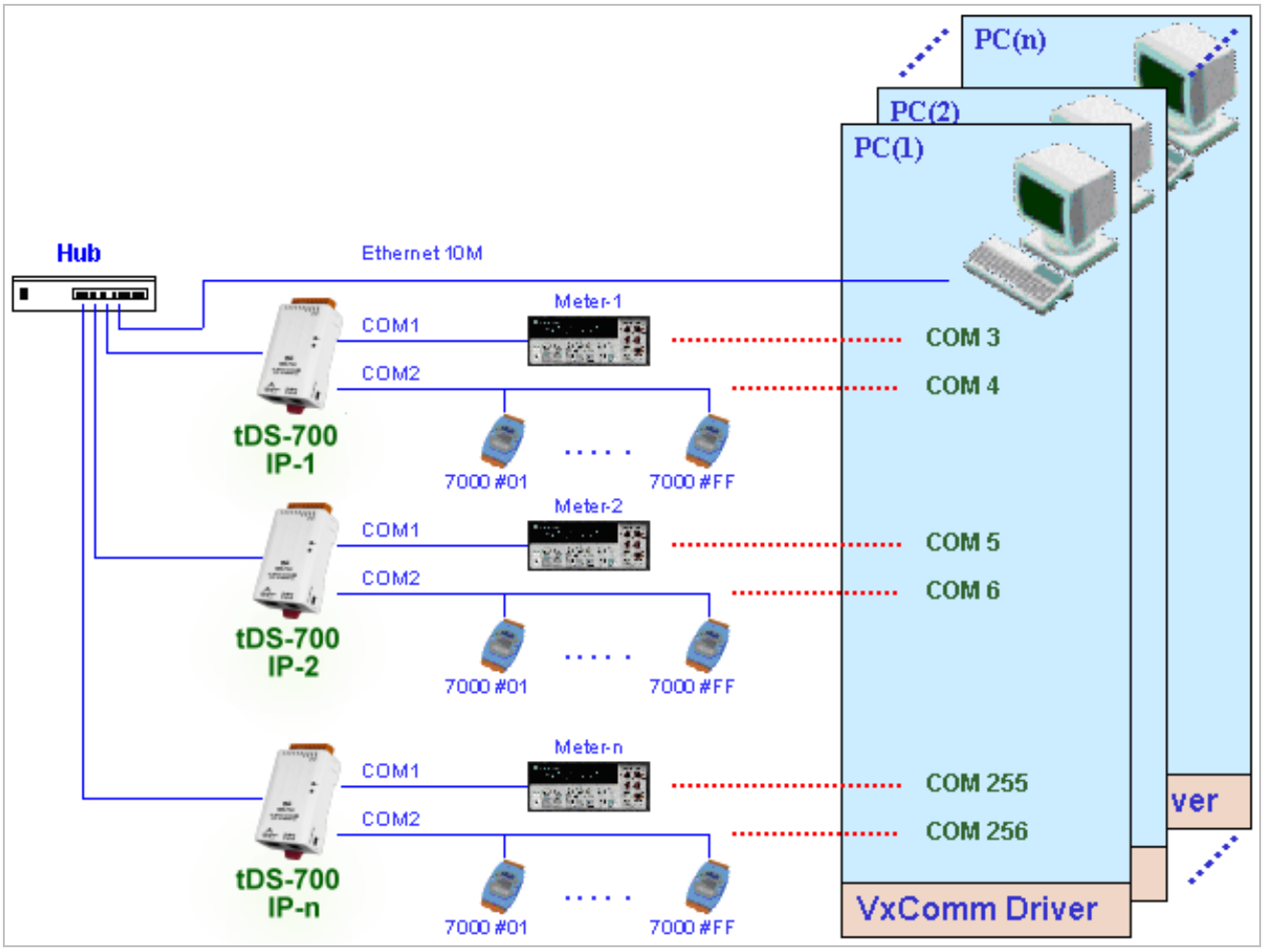
1.2 VxComm Technology

In general, writing a TCP/IP program is more difficult than writing a COM Port program. Another issue is that perhaps the existing the COM Port communication system was built many years ago and is now outdated.

As a result, a new technology, VxComm was developed to virtualize the COM Ports of the tDS-700 to allow up to 256 COM Ports to be used on a central computer. The VxComm driver saves time when accessing serial devices through the Ethernet without the need for reprogramming the COM Port software on the PC.



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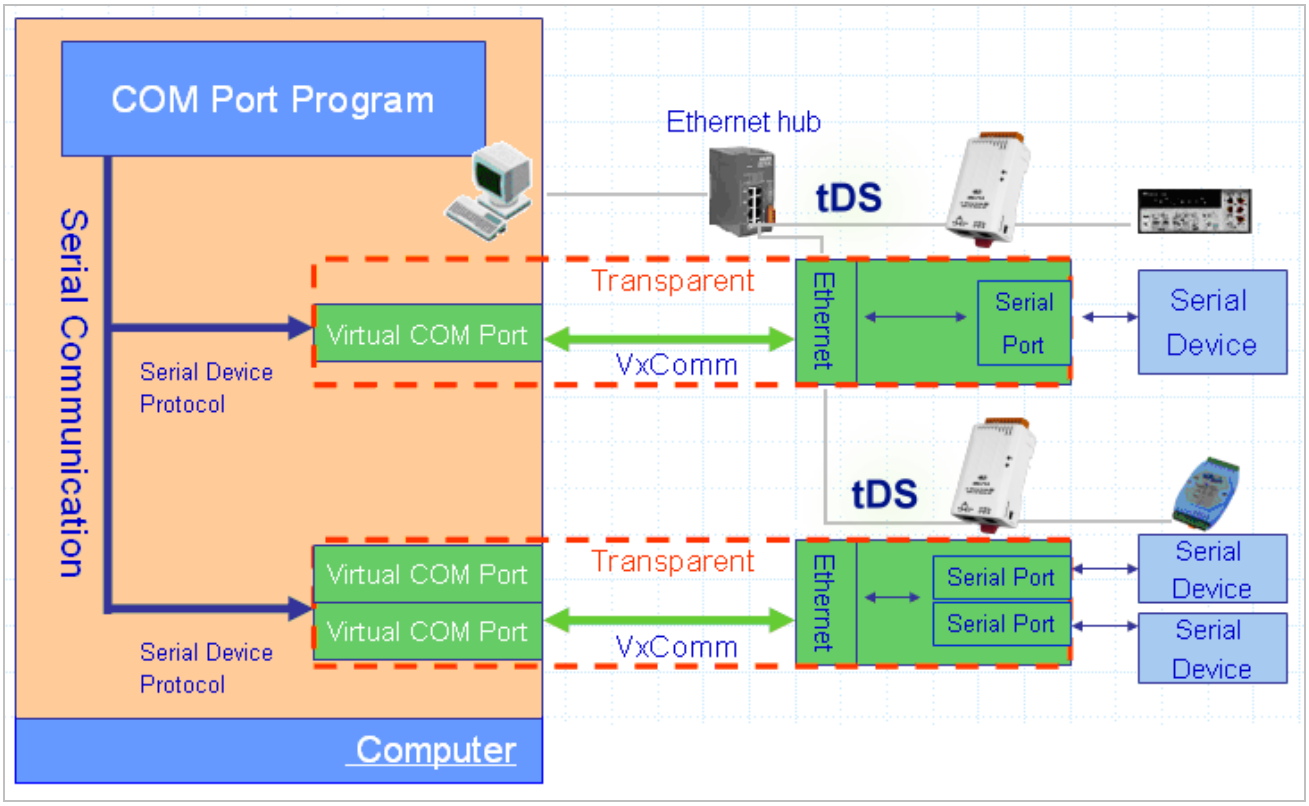
The VxComm driver controls all the details of the Ethernet TCP/IP programming technique, meaning that, with the assistance of tDS-700 and VxComm technology, your COM Port program will be able to access your serial devices through the Ethernet in the same way as through a COM Port.



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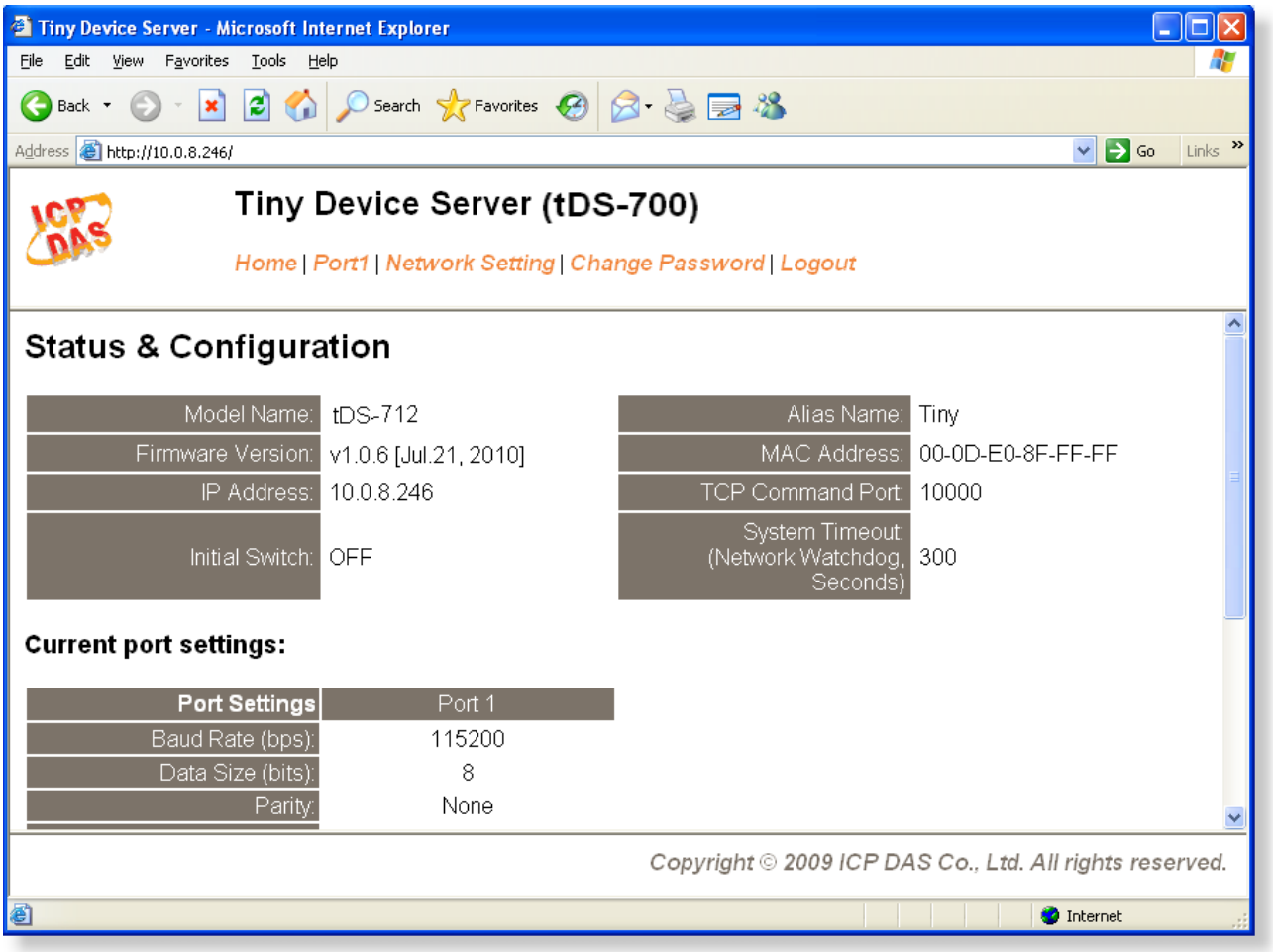
1.3 Web Server Technology

Web server technology enables the tDS-700 to be configured via a standard web browser interface, e.g. Google Chrome, Internet Explorer, or Firefox, etc. This means that it is easy to check the configuration of the tDS-700 via an Ethernet network without needing to install any other software tools, thereby reducing the learning curve required for maintaining the device.


Tiny Device Server - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites
Address http://10.0.8.246/
Go Links
Tiny Device Server (tDS-700)
Home | Port1 | Network Setting | Change Password | Logout
Status & Configuration
Model Name: tDS-712
Firmware Version: v1.0.6 [Jul.21, 2010]
IP Address: 10.0.8.246
Initial Switch: OFF
Alias Name: Tiny
MAC Address: 00-0D-E0-8F-FF-FF
TCP Command Port: 10000
System Timeout (Network Watchdog, Seconds): 300
Current port settings:
Port Settings | Port 1
Baud Rate (bps): 115200
Data Size (bits): 8
Parity: None
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Internet

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2. Hardware Information

This chapter provides a detailed description of the front panel, the hardware specifications, the pin assignments, the wiring notes and the dimensions for the tDS-700 series modules.

2.1 Specifications

Model	tDS-712	tDS-722	tDS-732	tDS-715	tDS-715i	tDS-725	tDS-735	tDS-718	tDS-724	tDS-734
System										
CPU	32-bit ARM									
Communication Interface										
Ethernet	10/100 Base-TX, 8-pin RJ-45 x 1, (Auto-negotiating, Auto-MDI/MDIX, LED indicator) PoE (IEEE 802.3af, Class 1)									
COM1	5-wire RS-232	5-wire RS-232	3-wire RS-232	2-wire RS-485 4-wire RS-422		2-wire RS-485	2-wire RS-485	3-wire RS-232 2-wire RS-485 4-wire RS-422	2-wire RS-485	2-wire RS-485
COM2	-	5-wire RS-232	3-wire RS-232	-		2-wire RS-485	2-wire RS-485	-	5-wire RS-232	3-wire RS-232
COM3	-	-	3-wire RS-232	-		-	2-wire RS-485	-	-	3-wire RS-232
Self-Tuner	-			Yes, automatic RS-485 direction control						
RS-485 Bias Resistor	-			Yes, 1 KΩ						
RS-485 Node	-			254 (max.)						
UART	16c550 or compatible									
Isolation	-	-	-	-	2500 V_{DC}	-	-	-	-	-
ESD Protection	-	-	-	-	+/-4 kV	-	-	-	-	-
COM Port Format										
Baud Rate	115200 bps Max.									
Data Bit	5, 6, 7, 8									
Parity	None, Odd, Even, Mark, Space									
Stop Bit	1, 2									
Power										
Power Input	PoE: IEEE 802.3af, Class 1 DC jack: +12 ~ 48 V_{DC}									
Power Consumption	0.07 A @ 24 V_{DC}									
Mechanism										
Connector	Male DB-9 x1	10-Pin Removable Terminal Block x 1								
Mounting	DIN-Rail									
Flammability	Fire Retardant Materials (UL94-V0 Level)									
Environment										
Operating Temperature	-25 ~ +75 °C									
Storage Temperature	-30 ~ +80 °C									
Humidity	10 ~ 90% RH, non-condensing									
Note: COM1/COM2/COM3 = TCP Port 10001/10002/10003										

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2.2 Features

- Incorporates any RS-232/422/485 serial device in Ethernet
- Data transmission via Virtual COM or raw TCP connection
- VxComm Driver for 32-bit and 64-bit Windows XP/2003/2008/Vista/7/8/10
- Max. connections: 1 socket per serial port is suggested
- Supports pair-connection (serial-bridge, serial-tunnel) applications
- Supports TCP client-mode and TCP server-mode operations
- Supports UDP responder for device discovery (UDP Search)
- Static IP or DHCP network configuration
- Easy firmware update via the Ethernet (BOOTP, TFTP)
- Tiny Web server for configuration (HTTP)
- Contains a 32-bit MCU that efficiently handles network traffic
- 10/100 Base-TX Ethernet, RJ-45 x1 (Auto-negotiating, auto MDI/MDIX, LED Indicators)
- Includes redundant power inputs: PoE (IEEE 802.3af, Class 1) and DC jack
- Allows automatic RS-485 direction control
- 2500 V_{DC} isolation and +/- 4 kV ESD protection for i versions
- Male DB-9 or terminal block connector for easy wiring
- Tiny form-factor and low power consumption
- RoHS compliant with no Halogen
- Cost-effective device servers

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2.3 Selection Guide

Model	CPU	Ethernet	Baud Rate	COM1	COM2	COM3
tDS-712	32-bit MCU	10/100 Base-TX, PoE	115200 bps	5-wire RS-232	-	-
tDS-722				5-wire RS-232	5-wire RS-232	-
tDS-732				3-wire RS-232	3-wire RS-232	3-wire RS-232
tDS-715				2-wire RS-485 4-wire RS-422	-	-
tDS-715i				Isolated 2-wire RS-485 4-wire RS-422	-	-
tDS-725				2-wire RS-485	2-wire RS-485	-
tDS-735				2-wire RS-485	2-wire RS-485	2-wire RS-485
tDS-718				3-wire RS-232 2-wire RS-485 4-wire RS-422	-	-
tDS-724				2-wire RS-485	5-wire RS-232	-
tDS-734				2-wire RS-485	3-wire RS-232	3-wire RS-232

3-Wire RS-232: RxD, TxD, GND (Non-isolated)

5-Wire RS-232: RxD, TxD, CTS, RTS, GND (No-isolated)

2-Wire RS-485: DATA+, DATA-, GND (Non-isolated)

4-Wire RS-422: TxD+, TxD-, RxD+, RxD-, GND (Non-islated)

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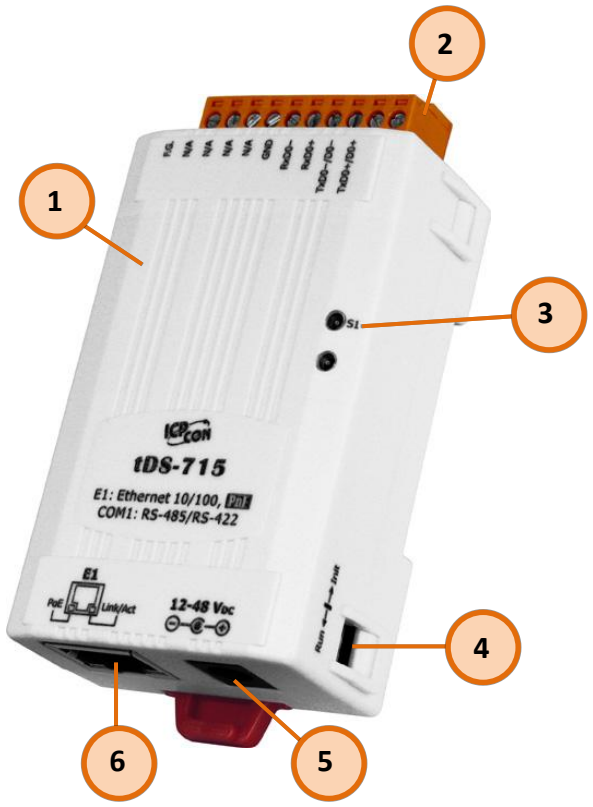
2.4 Appearance

Front View



1. Robust Insulated and Fire-retardant Case

2. Serial COM Ports

The number of serial COM Ports available depends on the type of tDS-700 module. For more detailed information regarding the pin assignments for the Serial COM ports, refer to Section 2.6 Pin Assignments.

3. S1: System LED indicator

Once power is supplied to the tDS-700 module, the system LED indicator will illuminate. An overview of the LED functions is given below:

Function	System LED Behavior
Running Firmware	Steady ON
Network Ready	Slow flashing – Once every 3 seconds
Serial Port Busy	Rapid flashing – Once every 0.2 seconds

4. Operating Mode Switch

Init Mode: Configuration mode

Run Mode: Firmware operation mode

For tDS-700 series modules, the operating mode switch is set to the **Run** position by default. In order to update the firmware for the tDS-700 module, the switch must be moved from the **Run** position to the **Init** position. The switch must be returned to the Run position after the update is complete.

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5. +12 to +48 V_{DC} Jack:

The tDS-700 is equipped with a +12 V_{DC} to +48 V_{DC} jack that can be used to connect a power supply. If no PoE switch is available on site, a DC adapter can be used to power the tDS-700 module.

6. PoE and Ethernet RJ-45 Jack

The tDS-700 module is equipped with an RJ-45 jack that is used as the 10/100 Base-TX Ethernet port and features networking capabilities. When an Ethernet link is detected and an Ethernet packet is received, the **Link/Act LED (Orange)** indicator will be illuminated. When power is supplied via PoE (Power-over-Ethernet), the **PoE LED (Green)** indicator will be illuminated.

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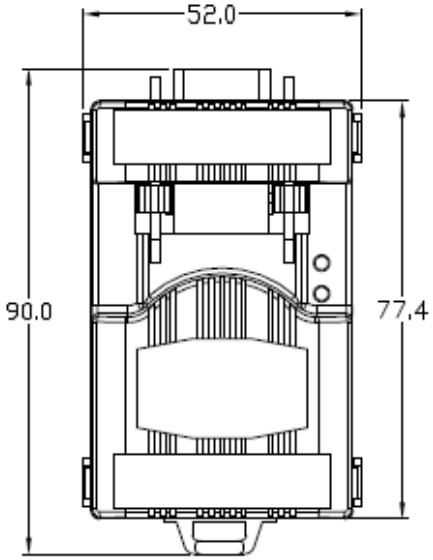
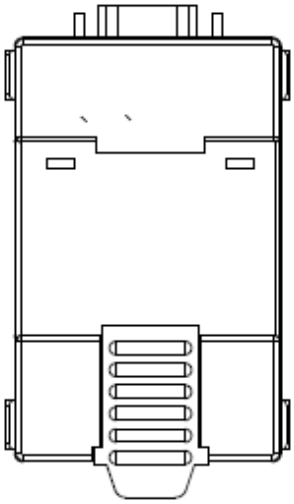
2.5 Dimensions

■ **tDS-712:**

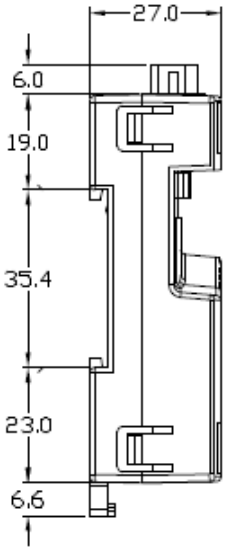
Units: mm



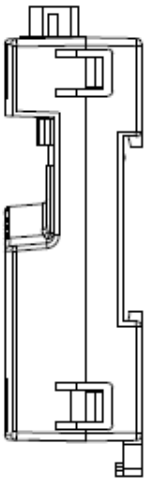
Front View



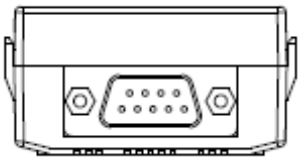
Rear View



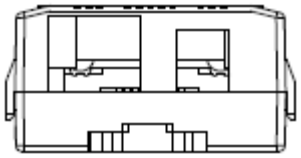
Left Side View



Right Side View



Top View



Bottom View

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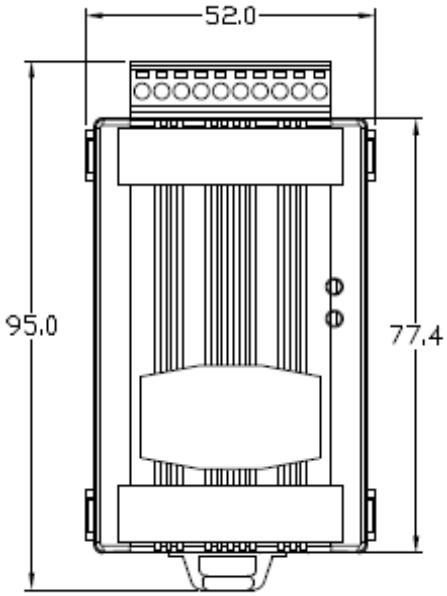
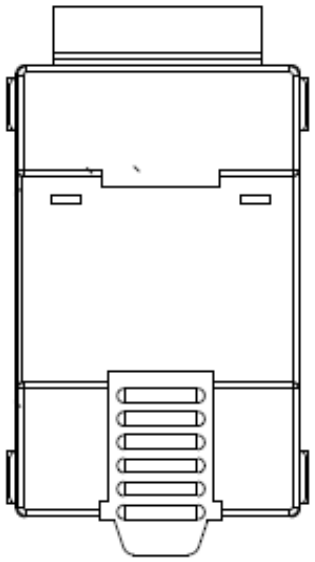
tDS-722/732/715/715i/725/735/718/724/734 :

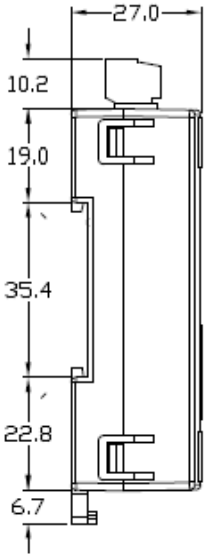
Units: mm



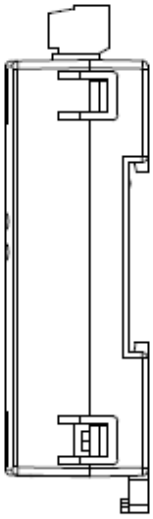
Front View



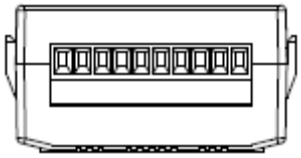
Rear View



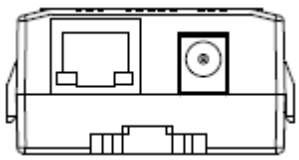
Left Side View



Right Side View



Top View



Bottom View

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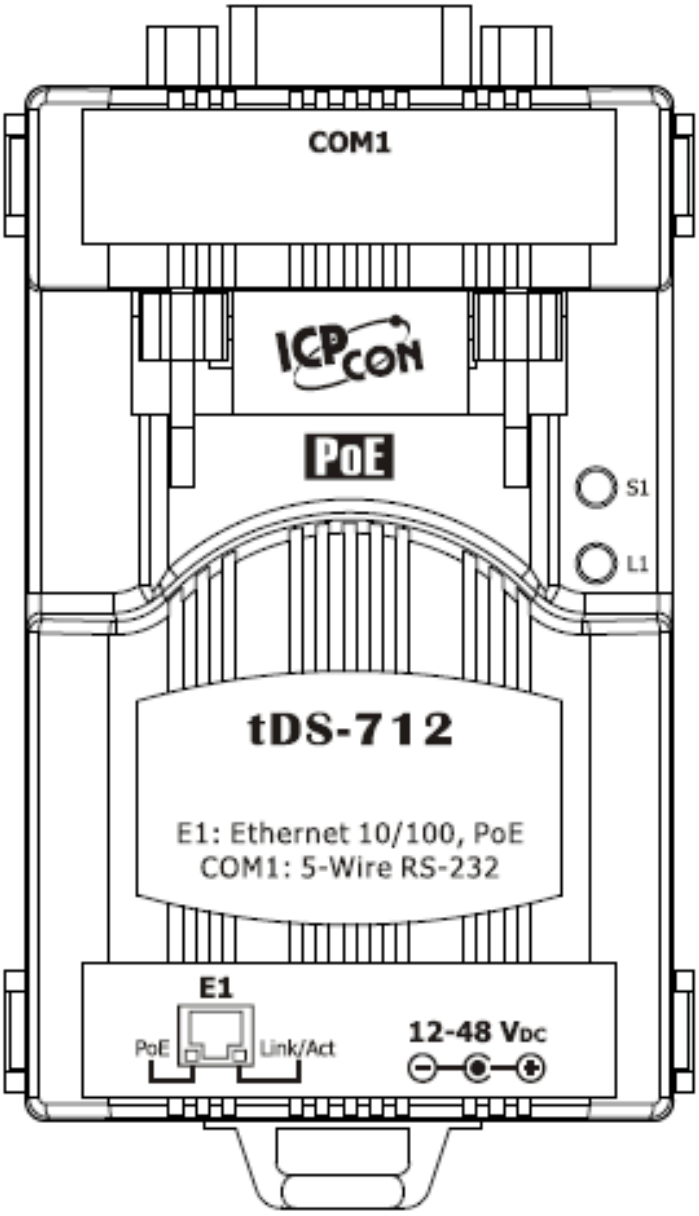
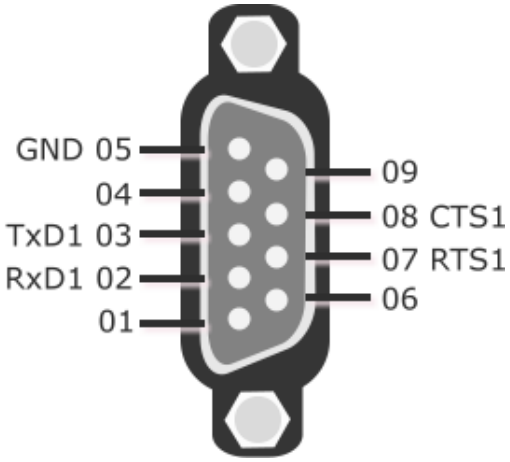
2.6 Pin Assignments

2.6.1 tDS-712 (1-Port, 5-wire RS-232 Module)





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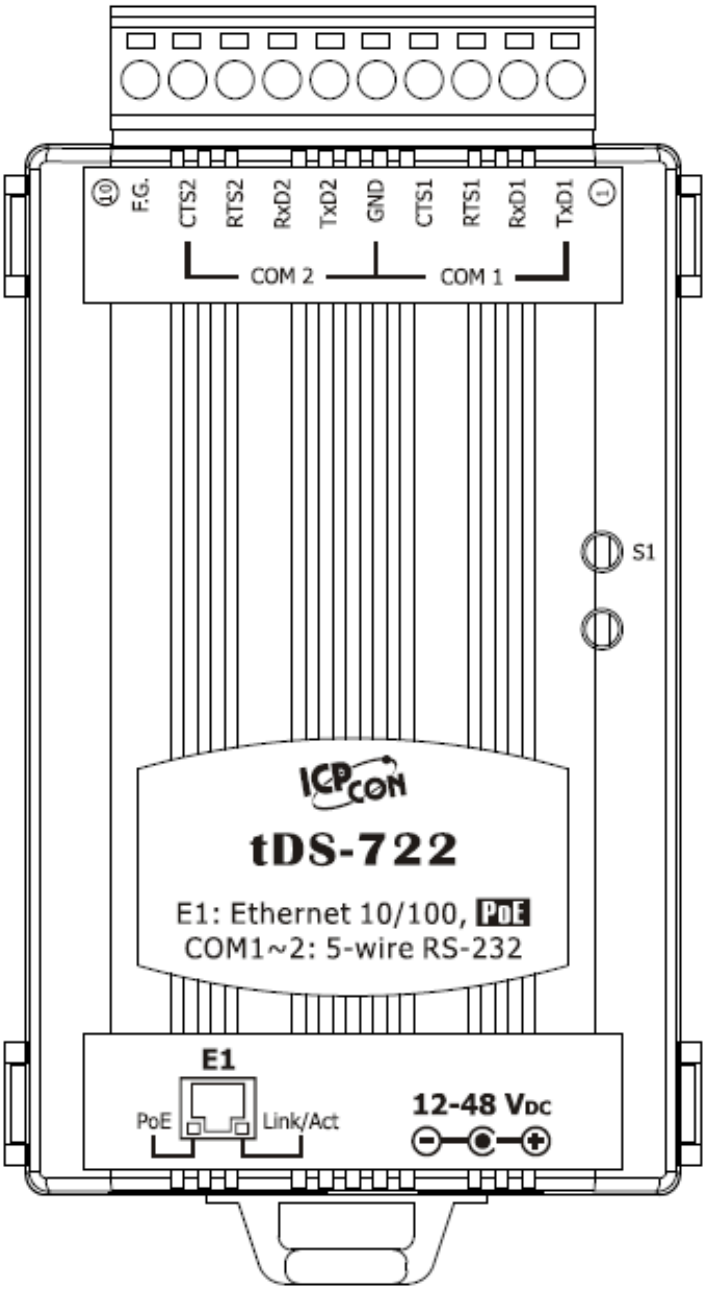
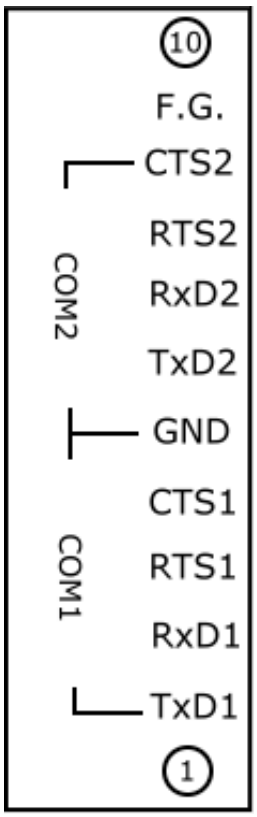
2.6.2 tDS-722 (2-Port, 5-wire RS-232 Module)





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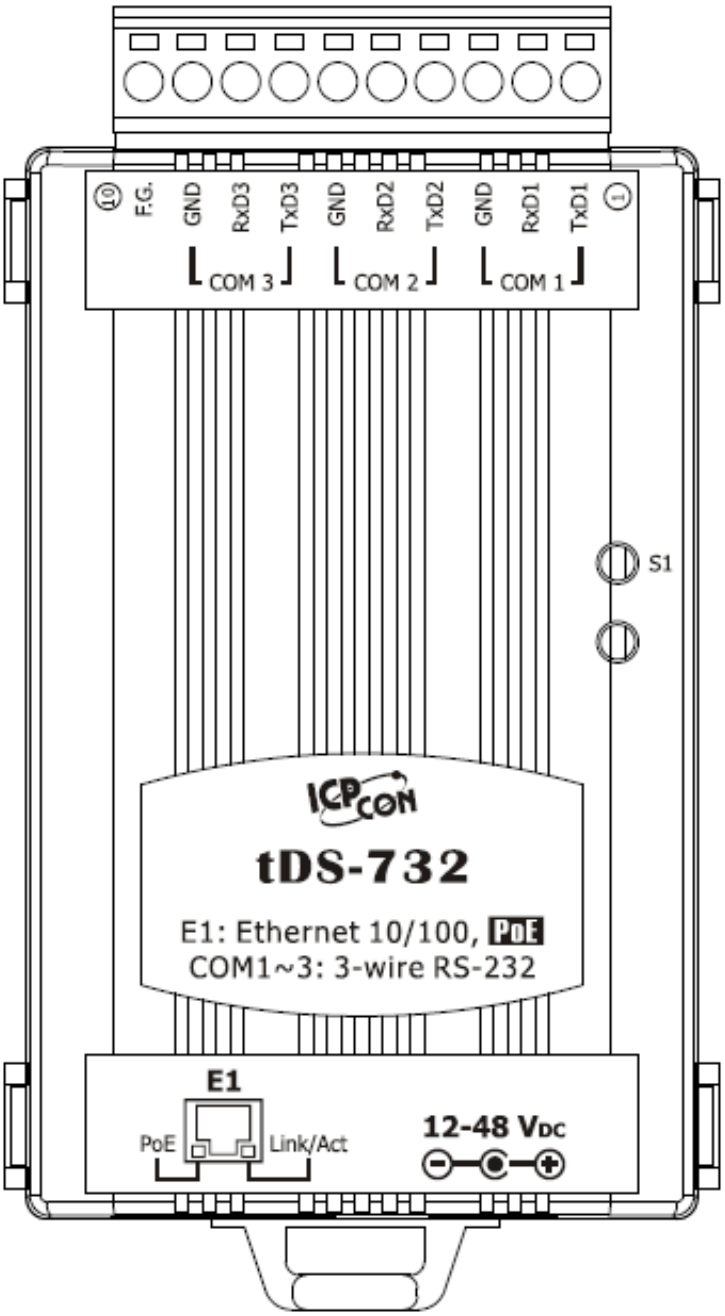
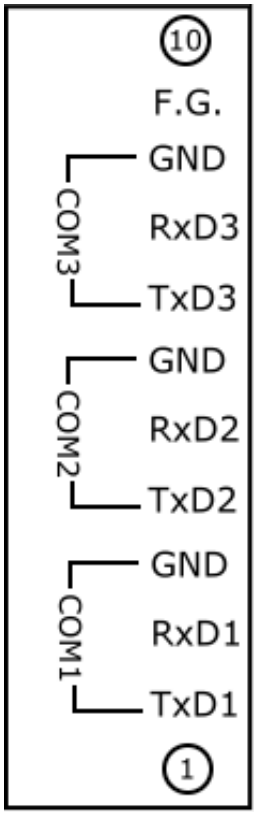
2.6.3 tDS-732 (3-Port, 3-wire RS-232 Module)





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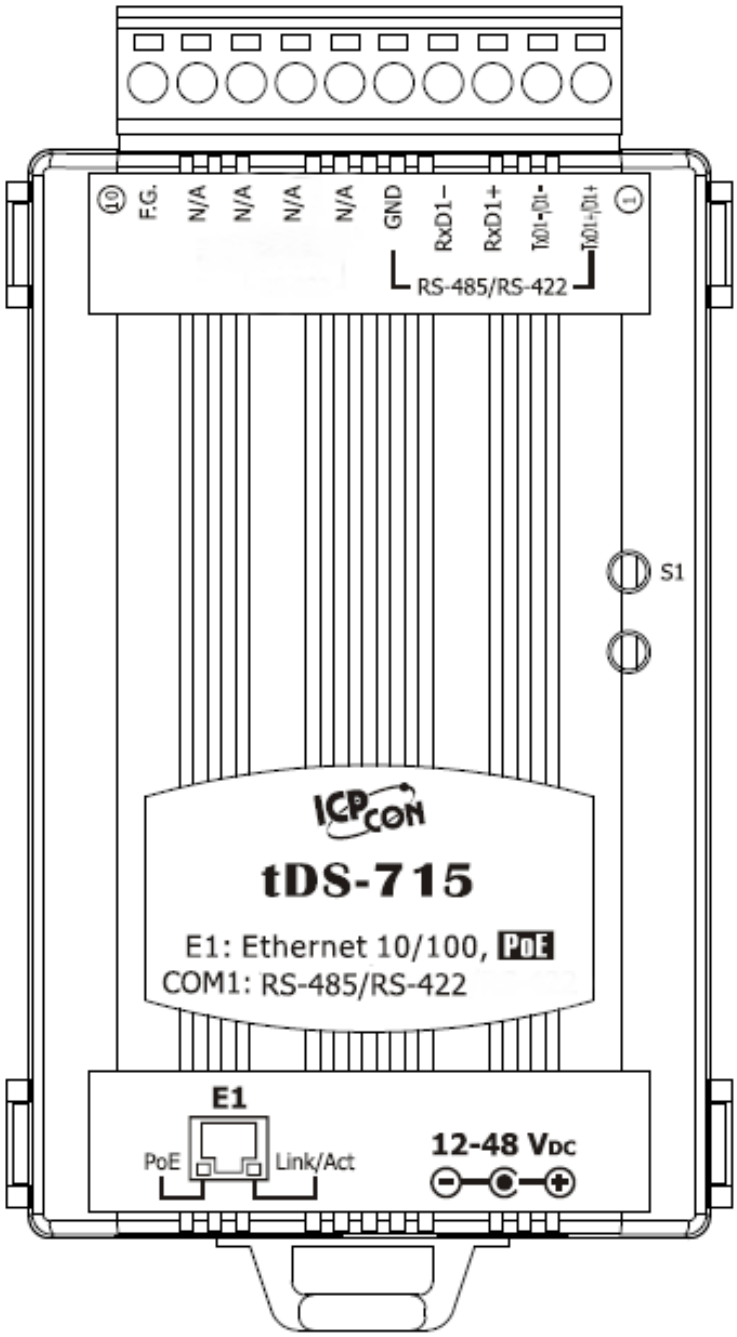
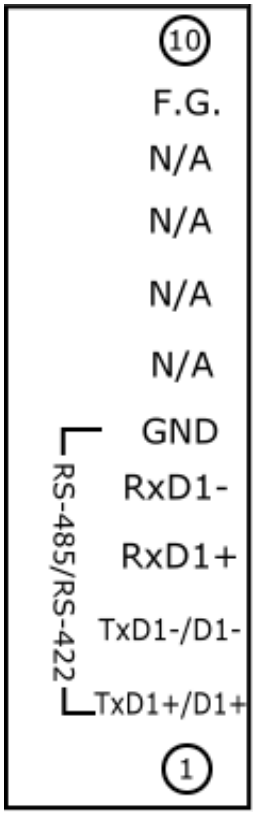
2.6.4 tDS-715 (1-Port, 2/4-wire RS-485/422 Module)





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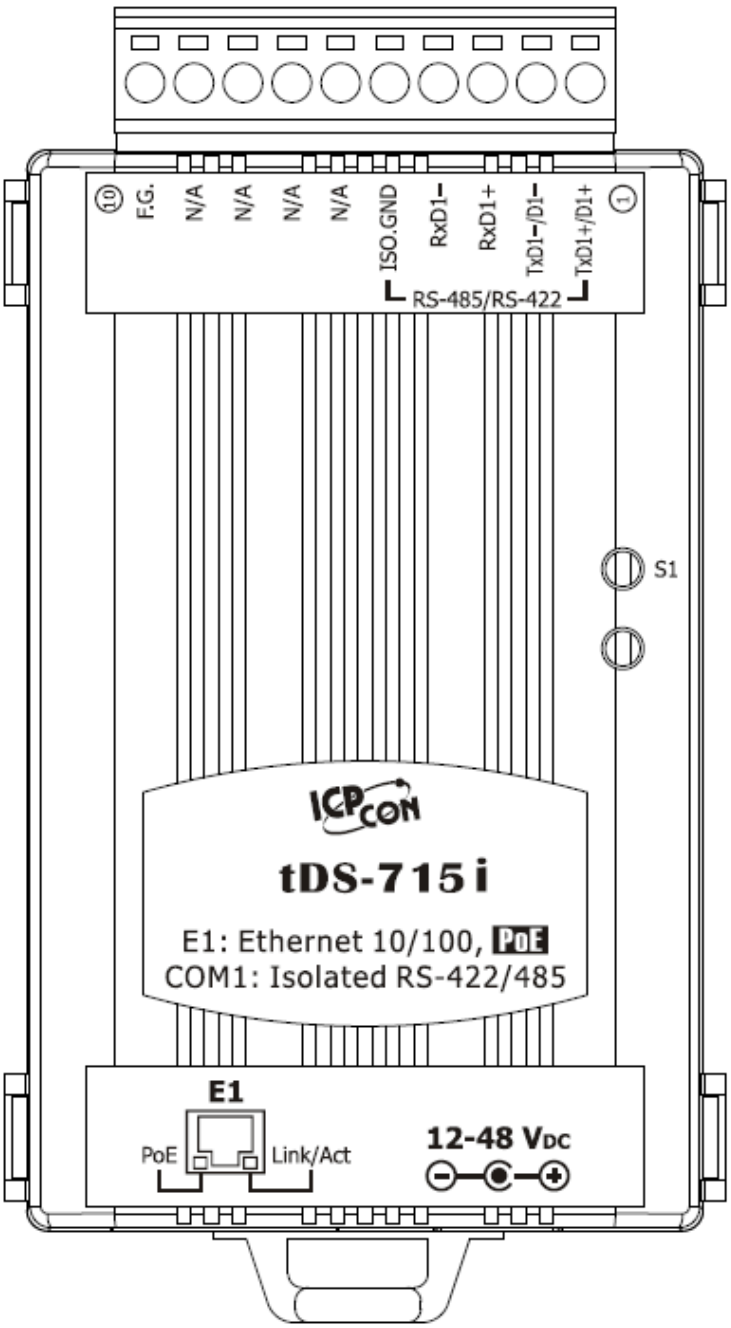
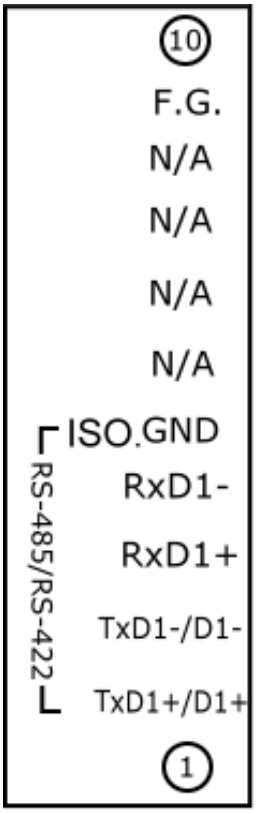
2.6.5 tDS-715i (1-Port Isolated 2/4-wire RS-485/422 Module)





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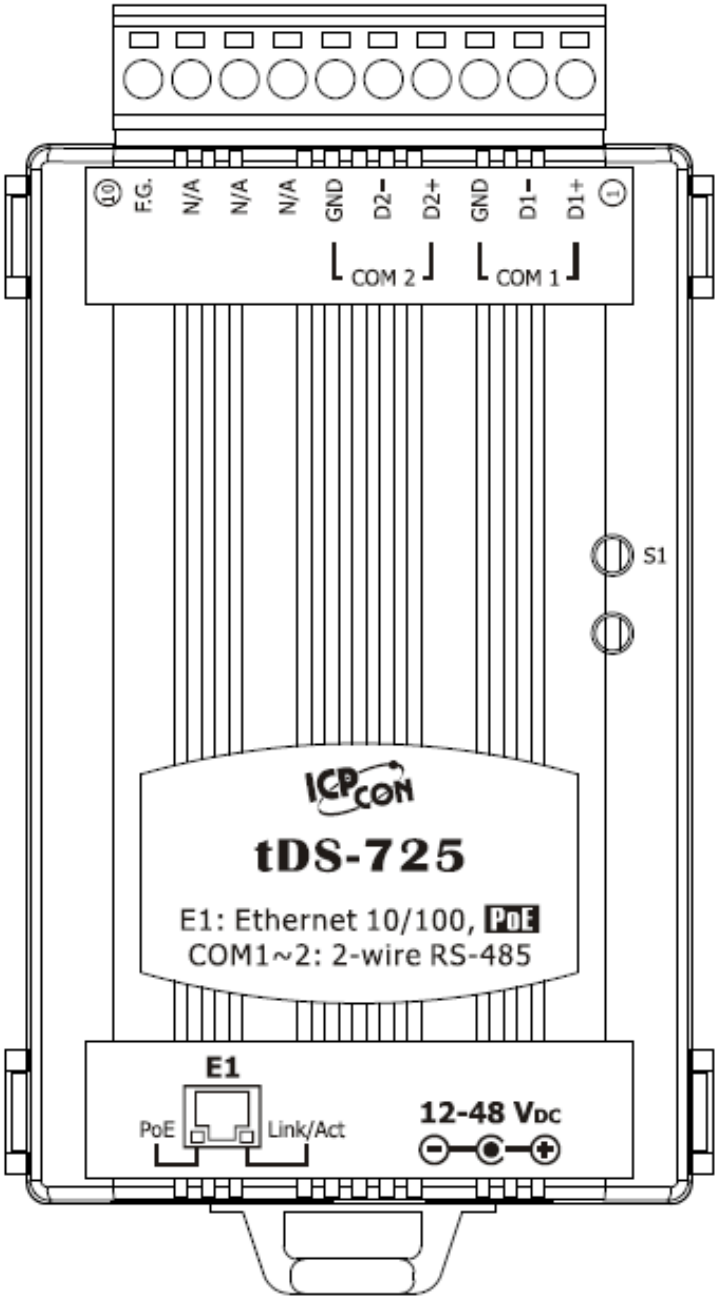
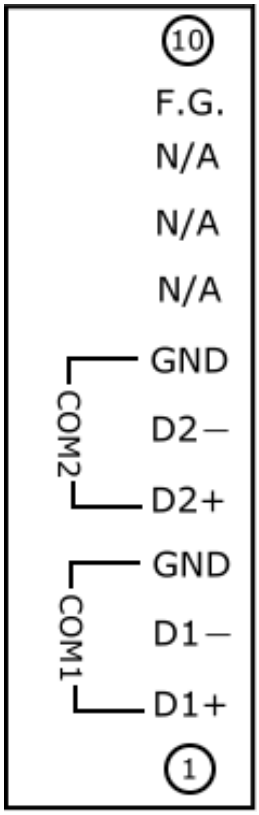
2.6.6 tDS-725 (2-Port, 2-wire RS-485 Module)





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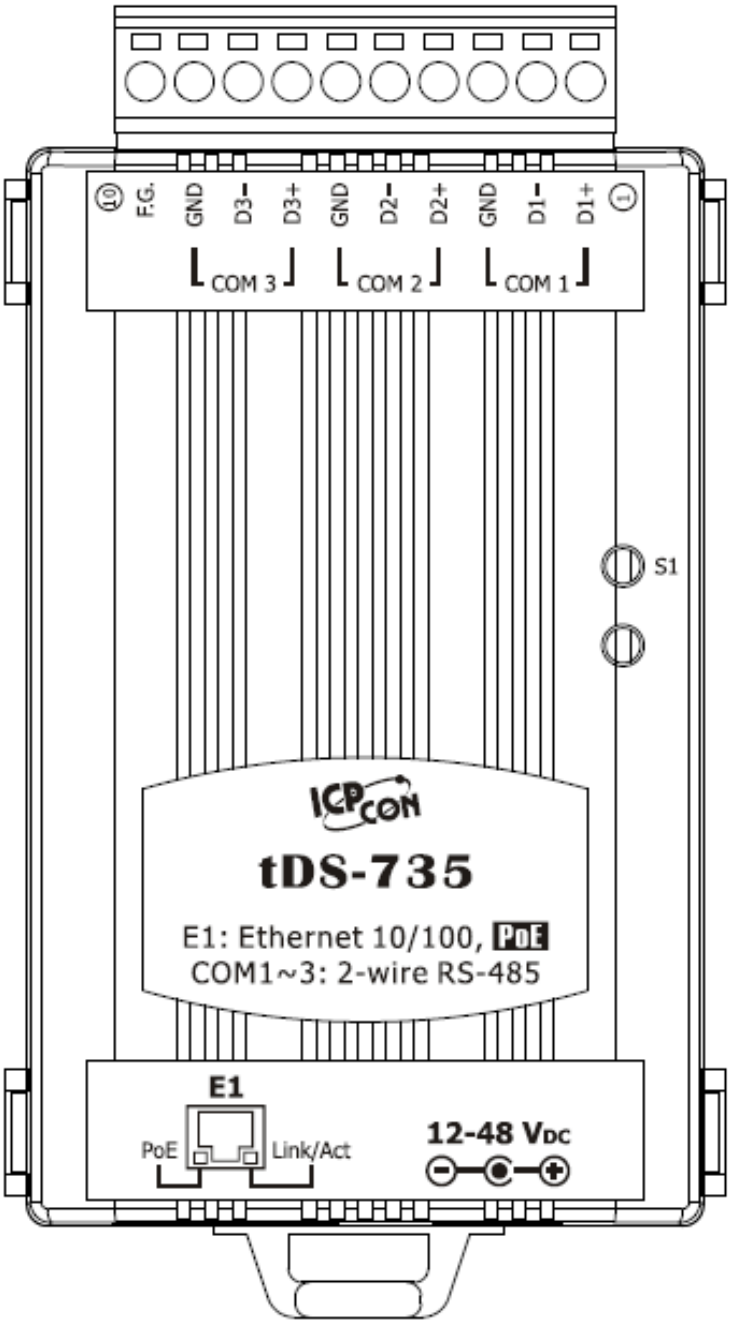
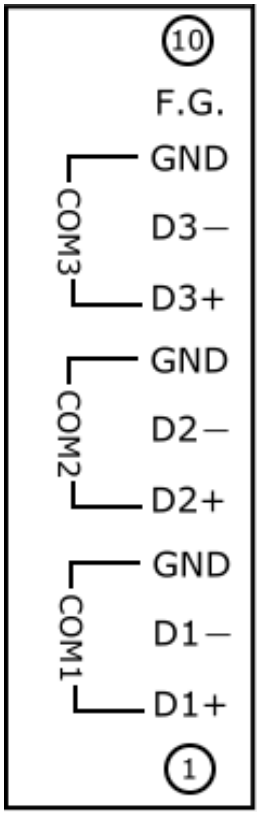
2.6.7 tDS-735 (2-Port, 3-wire RS-485 Module)





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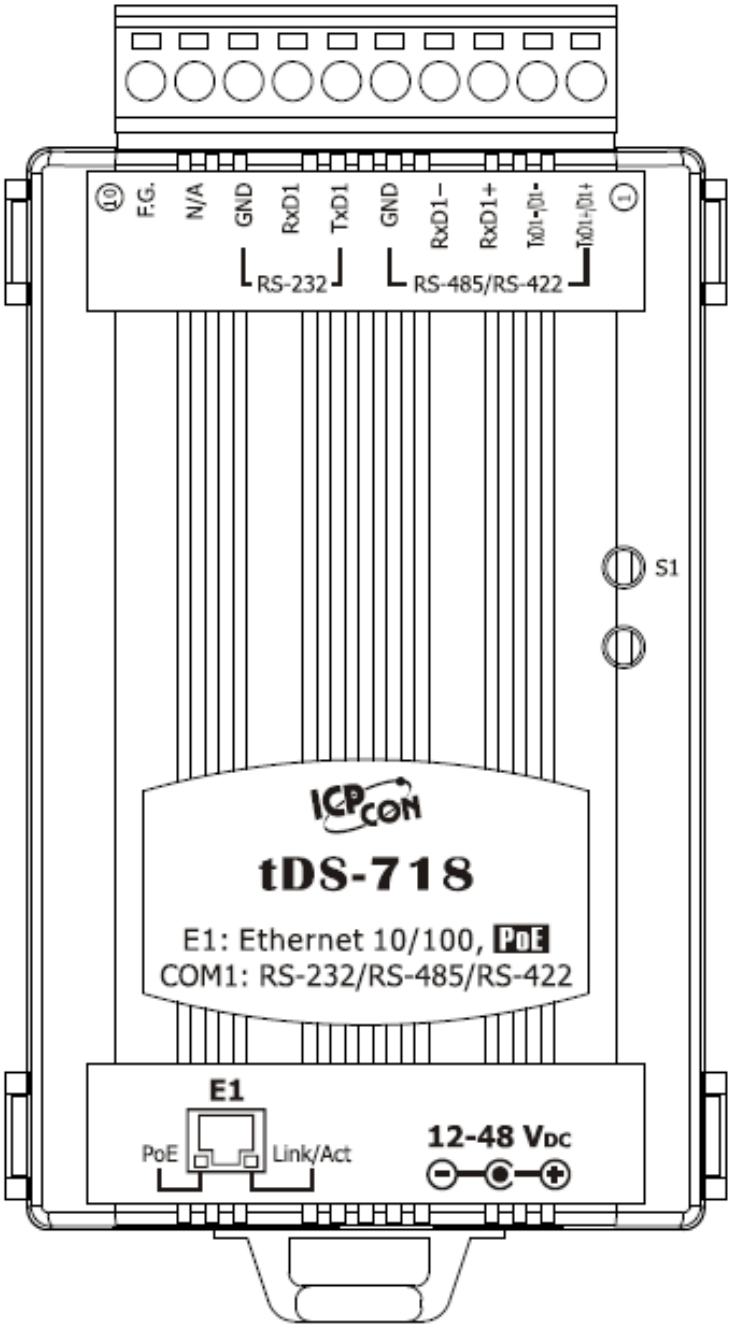
2.6.8 tDS-718 (1-Port, 3-wire RS-232 and 2/4-wire RS-485/422 Module)



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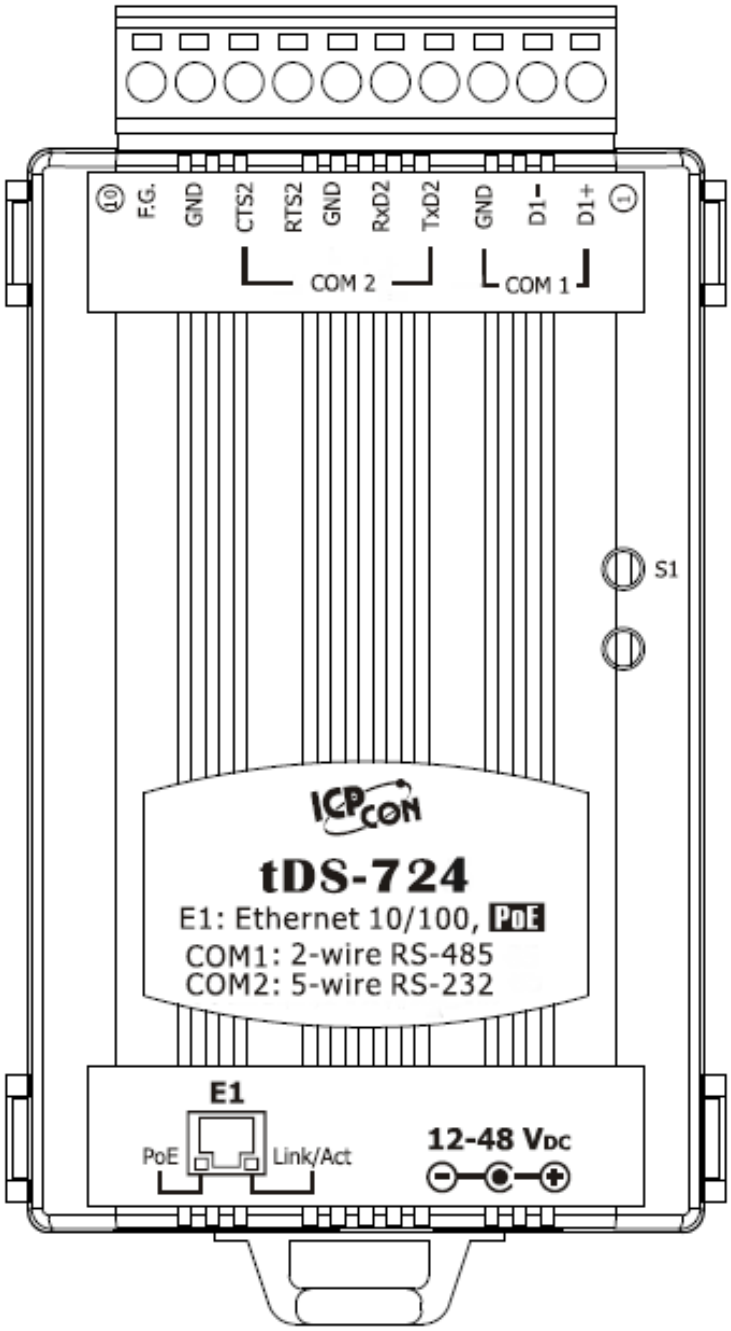
2.6.9 tDS-724 (1-Port, 2-wire RS-485 and 1-Port, 5-wire RS-232 Module)



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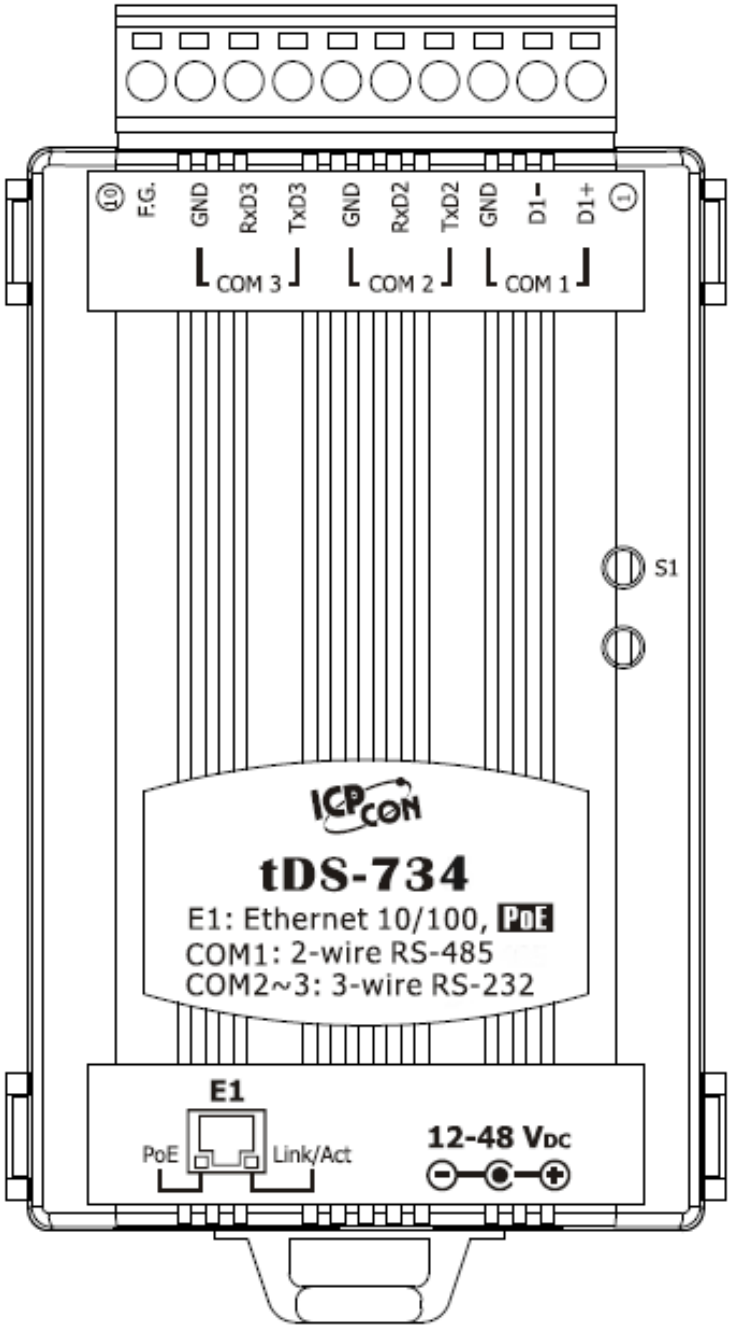
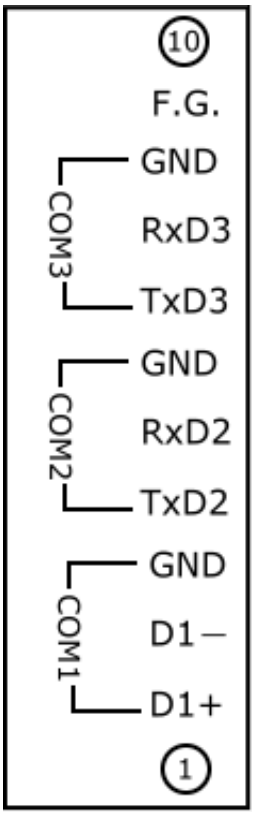
2.6.10 tDS-734 (1-Port, 2-wire RS-485 and 2-Port, 3-wire RS-232 Module)





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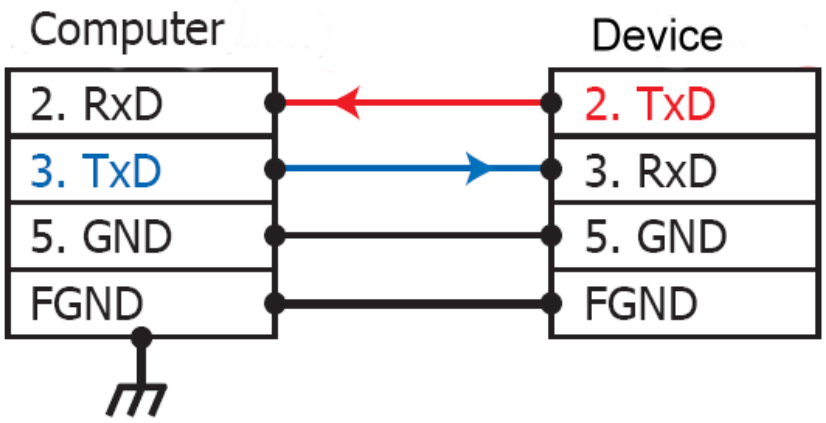
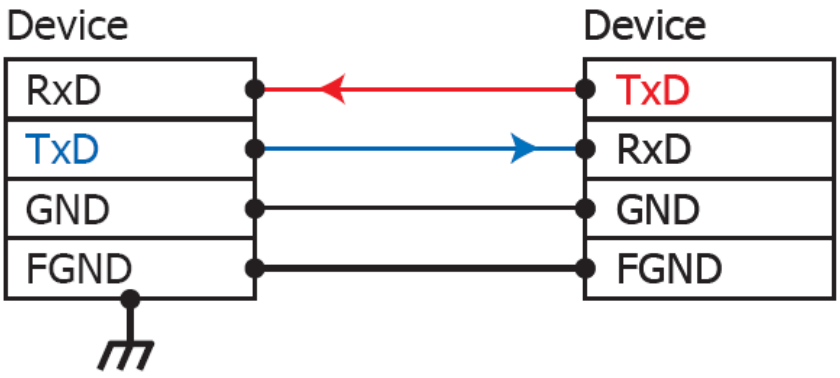
2.7 Wiring Notes for RS-232/485/422 Interfaces

2.7.1 RS-232 Wiring

5-wire RS-232 Connection (DB-9)



3-wire RS-232 Connection



Note:
FGND is the frame ground that is soldered to the metal shield on the DB-9 cable.

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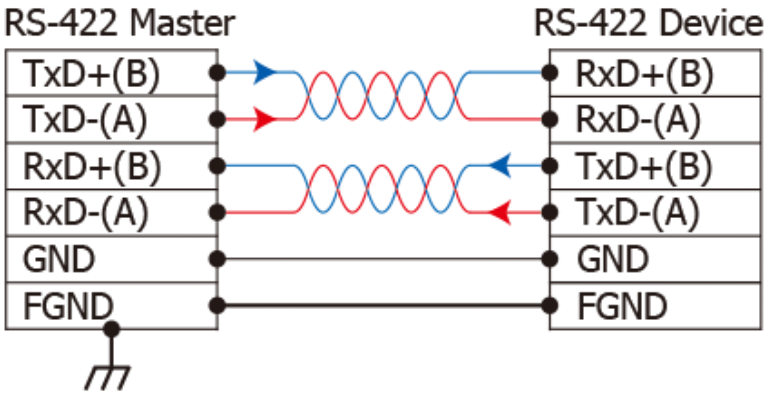
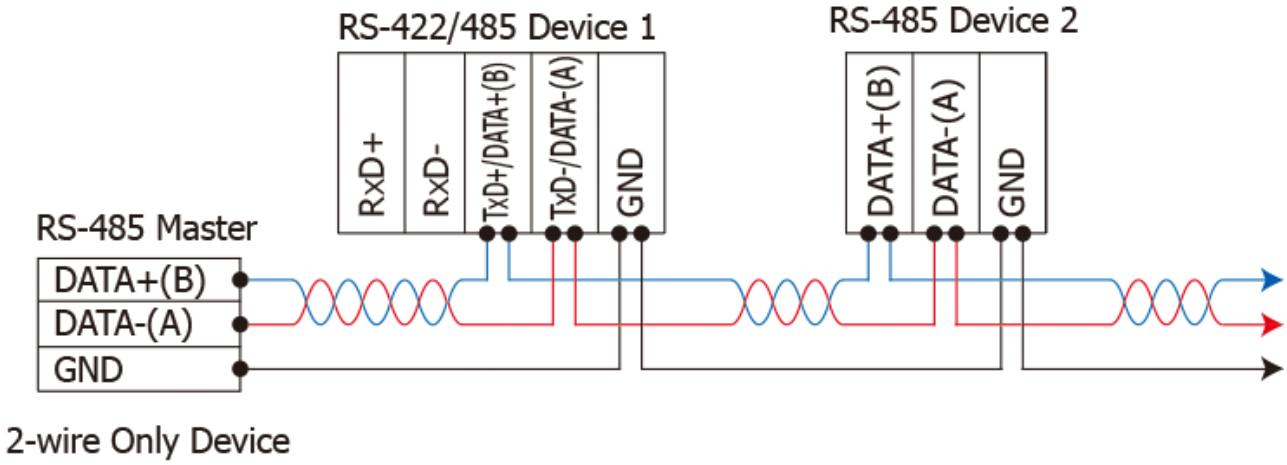
2.7.2 RS-422 Wiring



2.7.3 RS-485 Wiring



Note:

1. ***Usually, you have to connect all signal grounds of RS-422/485 devices together to reduce common-mode voltage between devices.***
2. ***Twisted-pair cable must be used for the DATA+/- wires.***
3. ***Both two ends of the cable may require a termination resistor connected across the two wires (DATA+ and DATA-). Typically 120 Ω resisters are used.***
4. ***The Data+ and B pins are positive-voltage pins, and Data- and A pins are negative-voltage pins in the above figure. The B/A pins may be defined in another way depending on devices, please check it first.***

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3. Setting up the tDS-700 Module

This chapter provides detailed information about the "Self-Test" process, which is used to confirm that the tDS-700 series module is operating correctly. Before beginning the "Self-Test" process, the wiring test, Ethernet configuration and VxComm utility driver installation procedures must first be fully completed. Follow the procedure described below:

Step 1: Connect the Power Supply and the Host PC

1. Ensure that the network settings on your PC are configured correctly.

2. Ensure that the Windows firewall or any Anti-Virus firewall software is correctly configured or temporarily disable these functions; otherwise the **"Search Servers"** function in the eSearch Utility may not work as required. You may need to contact your System Administrator for more details of how to do this.

3. Check that the Init/Run switch is in the **"Run"** position.

Figure 3-1

4. Connect both the tDS-700 and the Host computer to the same sub-network or the same Ethernet Switch, and then power on the tDS-700. Refer to **Figures 3-2 and 3-3** for illustrations of how to do this.

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+12 to +48 V_{DC} jack Power Supply (Non-PoE)

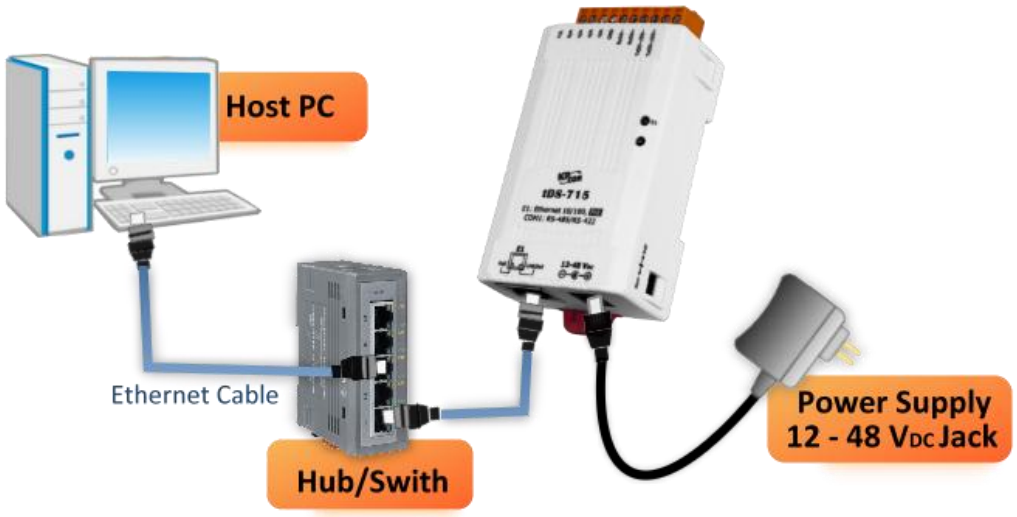

Figure 3-2

PoE Power Supply

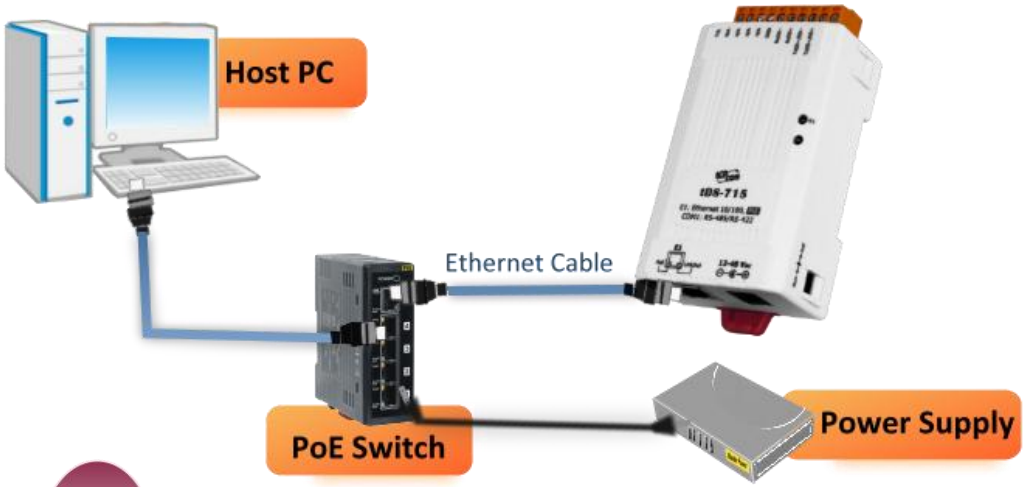

Figure 3-3

Figure 3-4

5. Verify that the System LED indicator is flashing.

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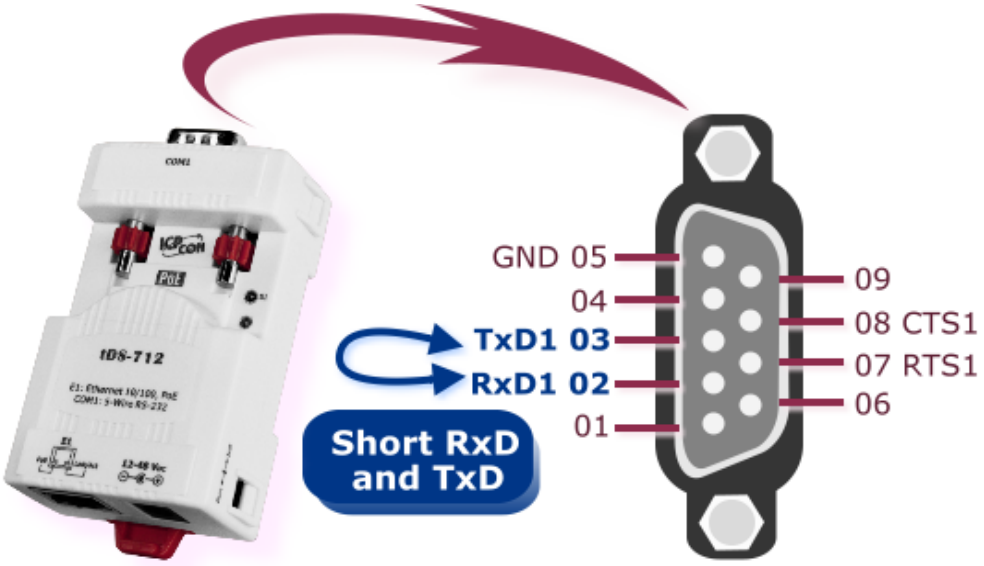
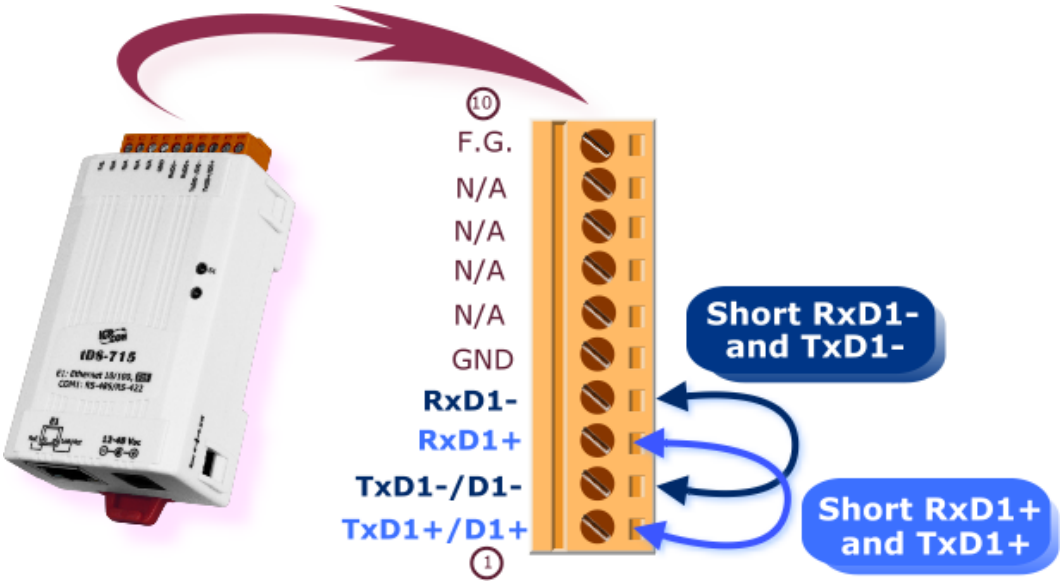
6. Perform a Self-test wiring check as follows:

➢ **RS-232 Wiring of COM1:**



➢ **RS-422 Wiring of COM1:**



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Step 2: Install the VxComm Utility

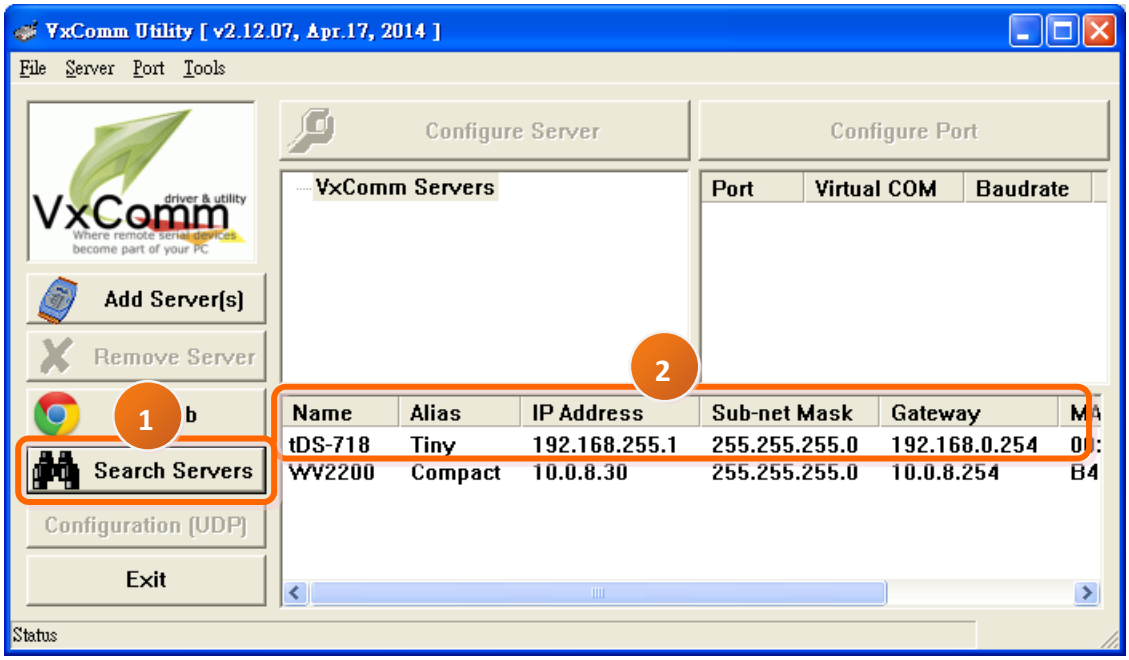
The VxComm Utility can be obtained from either the companion CD-ROM, the ICP DAS FTP site, or the ICP DAS web site. The location of the install files on the CD and the download addresses are shown below:

CD:\\ NAPDOS\Software\VxComm_Driver\

http://ftp.icpdas.com/pub/cd/tinymodules/napdos/software/vxcomm_driver/

Step 3: Search for the tDS-700 series module on the Ethernet network

1. Open the VxComm Utility and then click the **"Search Servers"** button to search for the tDS-700 module.
2. Once the search process is complete, double-click the name of the tDS-700 module to open the **"Configure Server"** dialog box.



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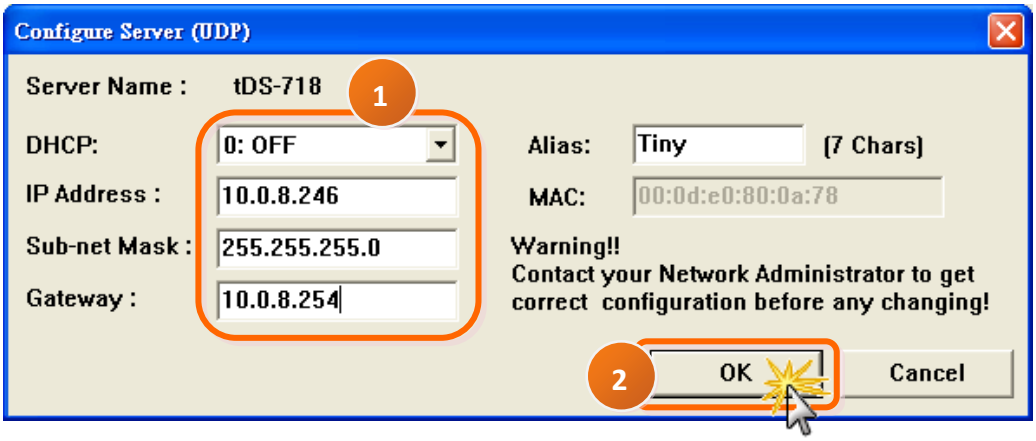
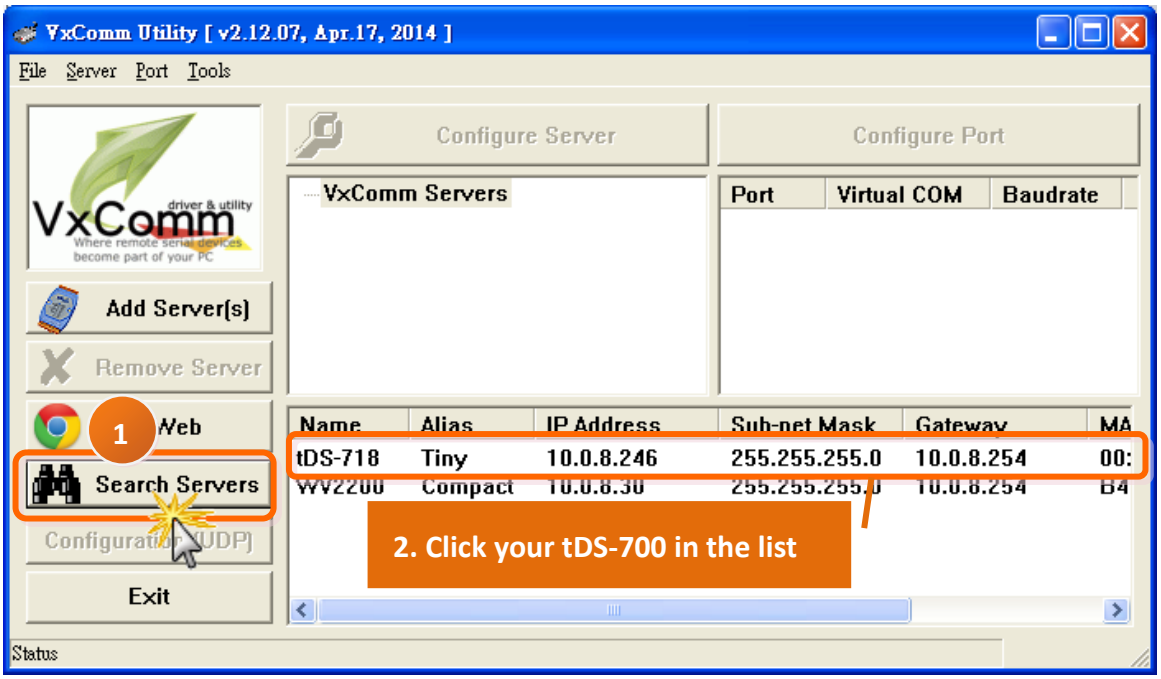
3. Enter the network settings information, including the **IP, Mask and Gateway addresses**, and then click **"OK"** button. The new settings for the tDS-700 will take effect within 2 seconds. If you don't know the correct network configuration information, contact your Network Administrator to obtain the details.



Step 4: Configuring the Virtual COM Ports

1. Wait 2 seconds and then click the **"Search Servers"** button again to ensure that the tDS-700 is working correctly with the new configuration.



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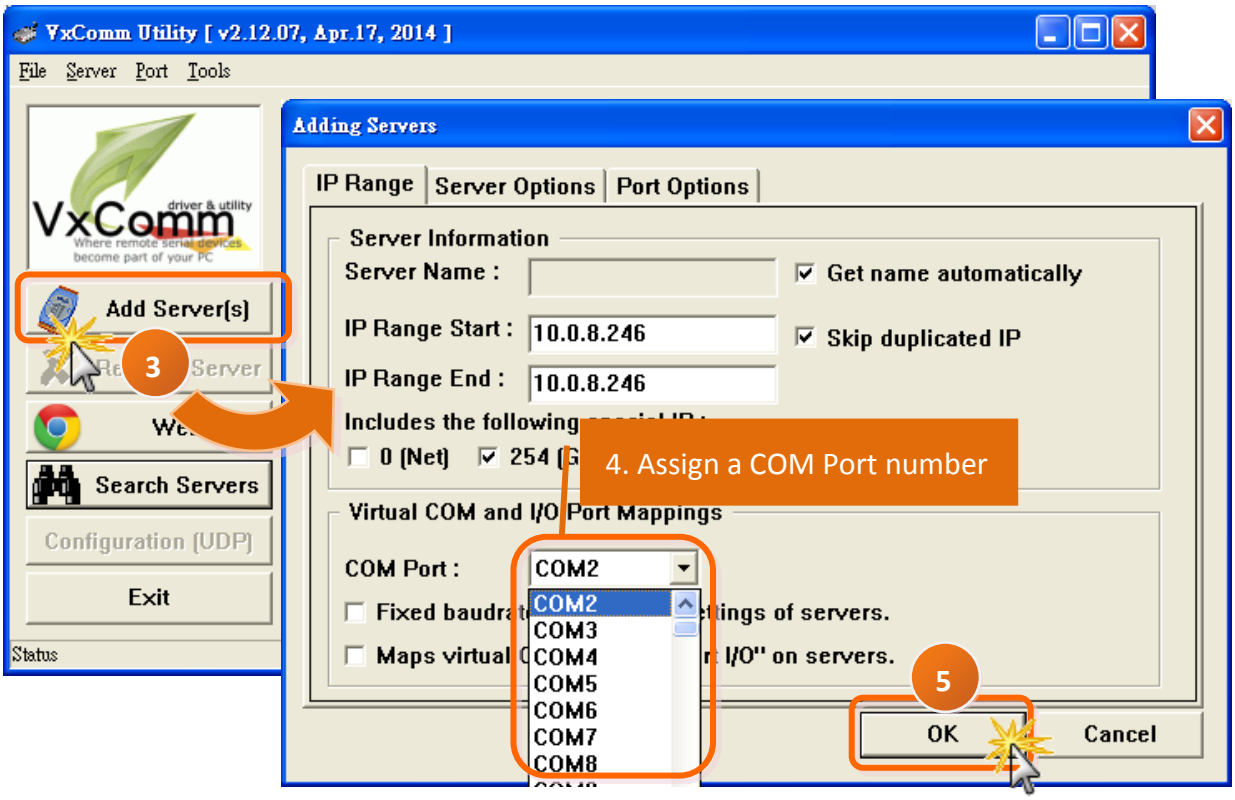
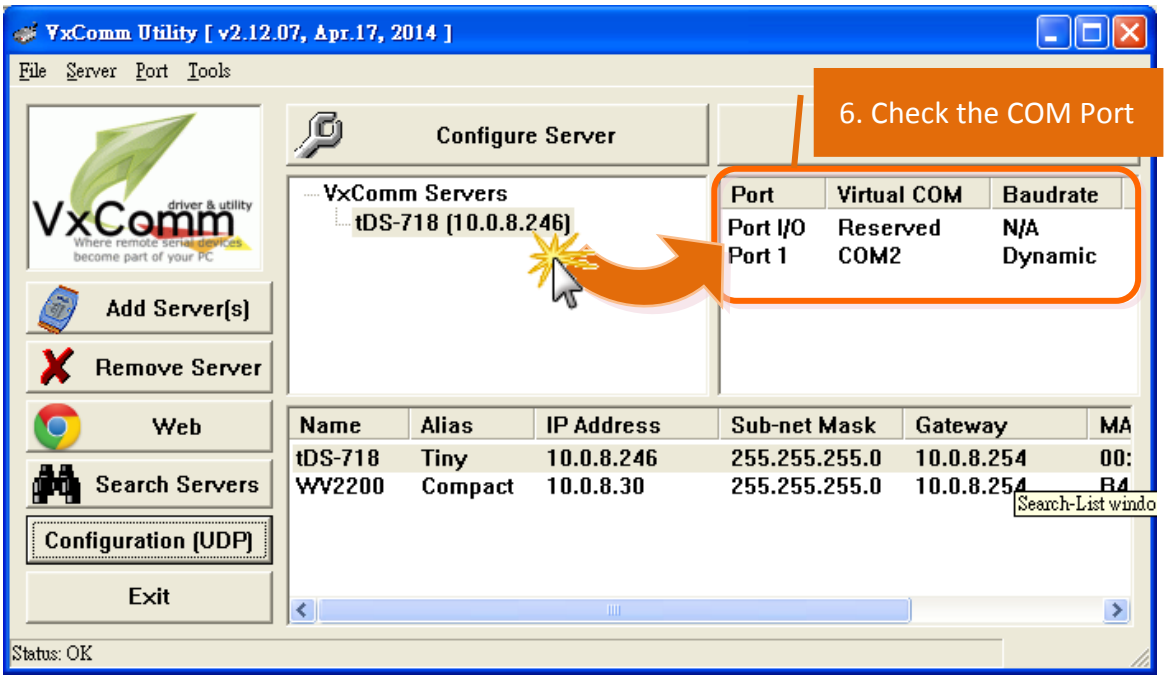
2. Click the **"Add Server[s]"** button. Assign a COM Port number and click **"OK"** to save your settings.



3. Click on tDS-700 name and check the virtual COM port mappings on the PC.



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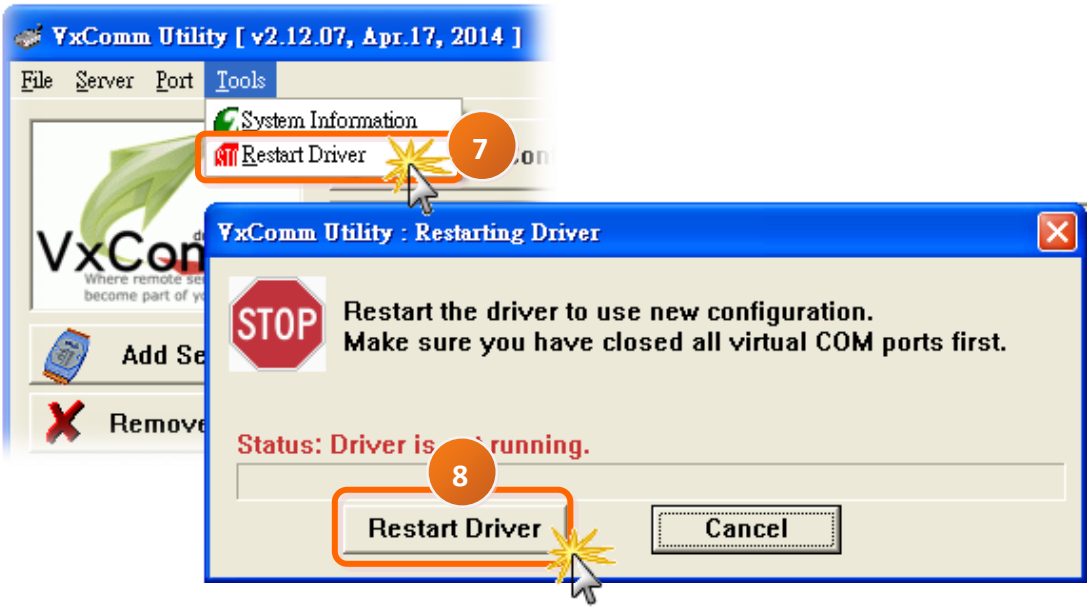
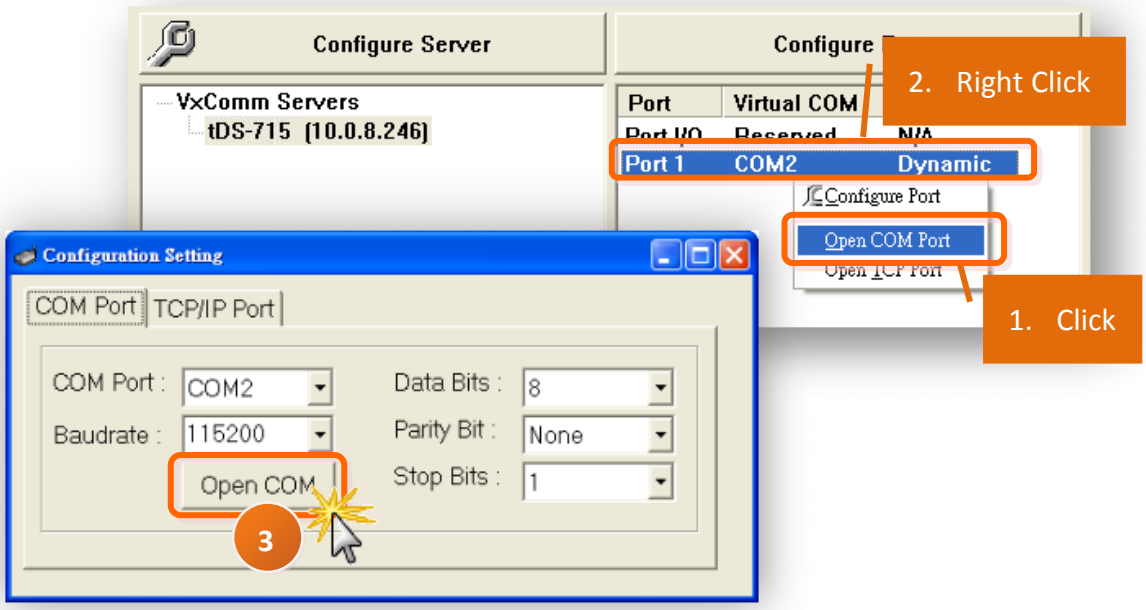
4. Click **“Tools” → “Restart Driver”**, and then click the **“Restart Driver”** button.



Step 5: Testing your tDS-700

1. Right click Port 1 and then choose the “**Open COM Port**” item.
2. Check that the configuration of the COM Port is correct and then click the “**Open COM**” button.



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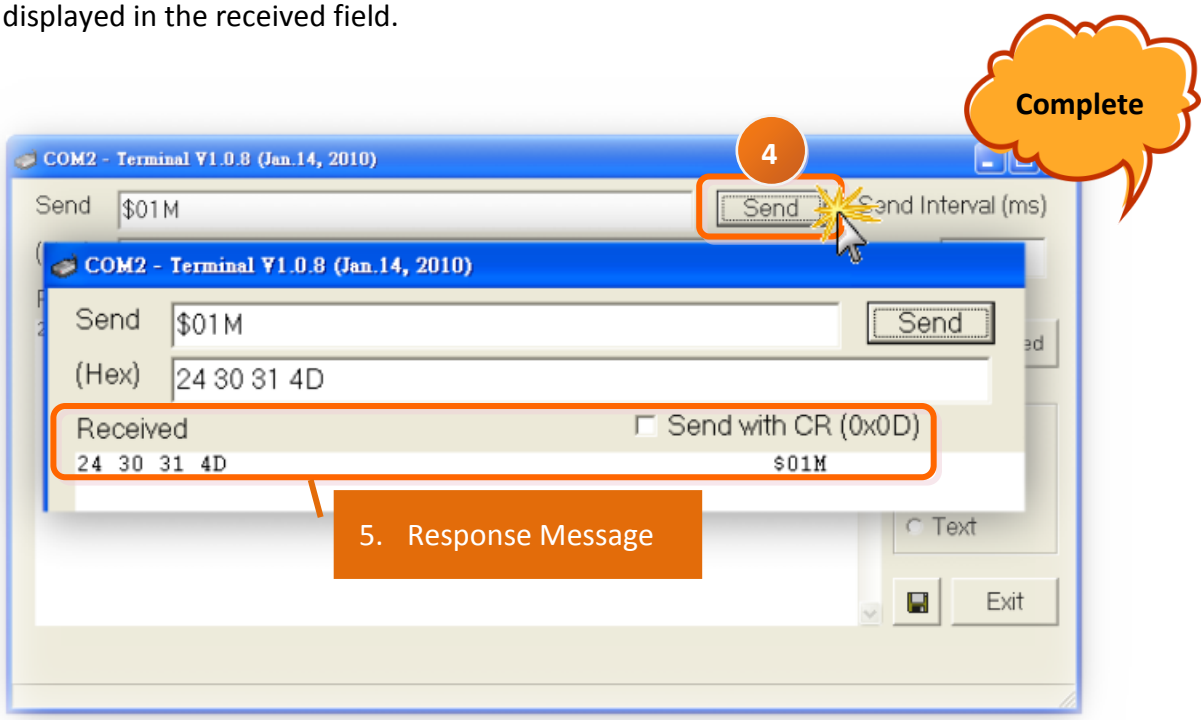
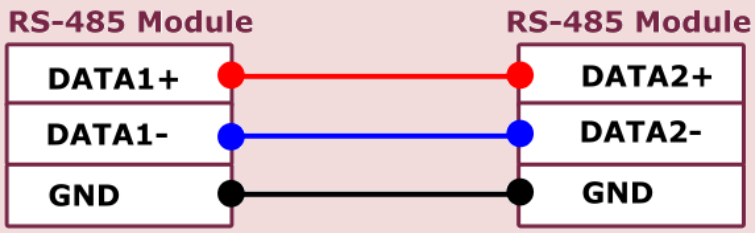
3. Type a string in the send field then click the "**Send**" button. If a response is received, it will be displayed in the received field.



4. If the test is successful, then your COM port program should now be able to work with this Virtual COM Port.

Note: While using RS-485 modules (Ex, tDS-725), you should wire the Data1+ and Data2+ signals, and wire the Data1- and Data2- signals when performing a self-test.



Open the first two COM Ports and use one to send data to and the other to receive data.

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4. Web Configuration

Once the tDS-700 module has been correctly configured and is functioning on the network normally, the configuration details can be retrieved or modified using either the VxComm Utility or a standard web browser.

4.1 Logging in to the tDS-700 Web Server

The embedded tDS-700 series web server can be accessed from any computer that has an Internet connection.

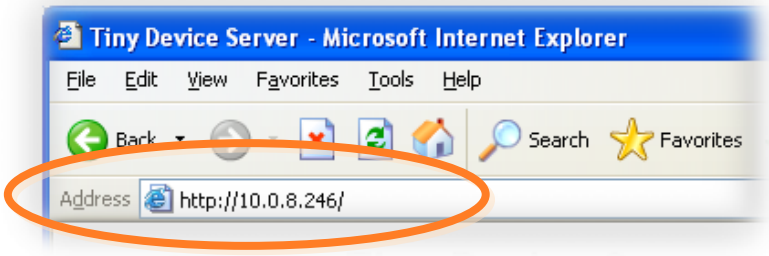
Step 1: Open a new browser window.

Open a web browser, for example, Google Chrome, Firefox or Internet Explorer, which are reliable and popular Internet browsers that can be used to configure tDS-700 series module.

Note that if you intend to use Internet Explorer, ensure that the cache function is disabled in order to prevent browser access errors. Detailed instructions for how to do this can be found in "FAQ: How to avoid a browser access error that causes a blank page to be displayed when using Internet Explorer".

Step 2: Enter the URL for the tDS-700 web server

Ensure that you have correctly configured the network settings for the tDS-700 series module (refer to Chapter 3 Setting up the tDS-700 module for detailed instructions), and then enter the URL for the tDS-700 web server in the address bar of the browser.



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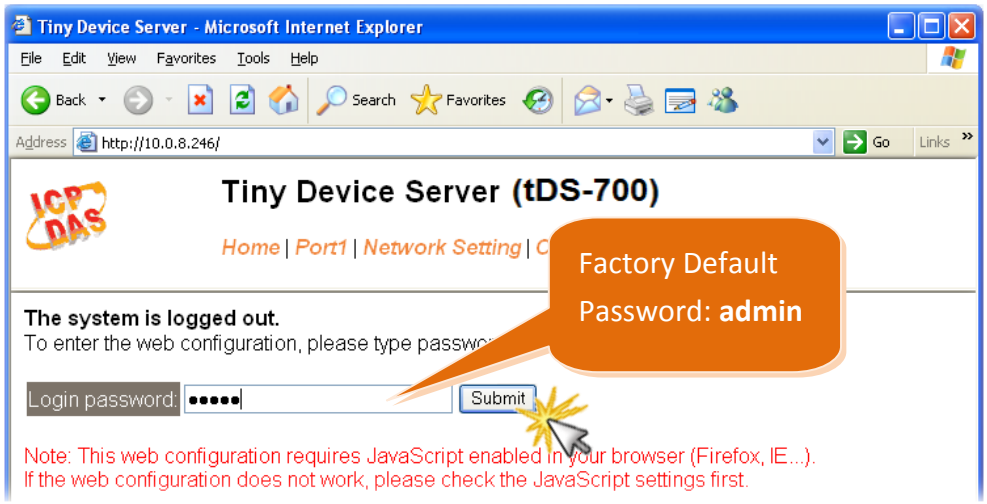
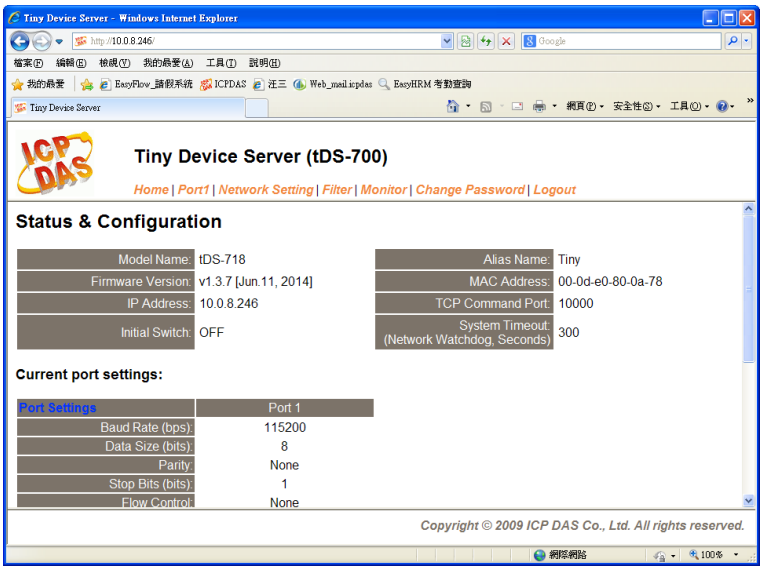
Step 3: Enter the Password

After the main login page is displayed, enter a password (the factory default password is **"admin"**), and then click the **"Submit"** button to continue.


Tiny Device Server - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites
Address http://10.0.8.246/
Go Links
Tiny Device Server (tDS-700)
Home | Port1 | Network Setting |
Factory Default
Password: admin
The system is logged out.
To enter the web configuration, please type passwo
Login password:
Submit
Note: This web configuration requires JavaScript enabled in your browser (Firefox, IE...).
If the web configuration does not work, please check the JavaScript settings first.

Step 4: Log in to the tDS-700 Web Server

After logging into the tDS-700 web server, the main page will be displayed.


Tiny Device Server - Windows Internet Explorer
Tiny Device Server (tDS-700)
Home | Port1 | Network Setting | Filter | Monitor | Change Password | Logout
Status & Configuration
Model Name: tDS-718
Alias Name: Tiny
Firmware Version: v1.3.7 [Jun.11, 2014]
MAC Address: 00-0d-e0-80-0a-78
IP Address: 10.0.8.246
TCP Command Port: 10000
Initial Switch: OFF
System Timeout (Network Watchdog, Seconds): 300
Current port settings:
Port Settings
Port 1
Baud Rate (bps): 115200
Data Size (bits): 8
Parity: None
Stop Bits (bits): 1
Flow Control: None
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4.2 Home Page

The Home link connects to the main page, which contains two parts.

- The first part of this page provides basic information about the tDS-700 hardware and software.

Status & Configuration

Model Name:	tDS-718	Alias Name:	0457_s
Firmware Version:	v1.3.8 [Nov.03, 2014]	MAC Address:	00-0d-e0-80-00-6b
IP Address:	10.0.8.246	TCP Command Port:	10000
Initial Switch:	OFF	System Idle: (Seconds)	300

- The second part of this page provides the status of the port settings and pair-connection settings.

Current port settings:

Port Settings	Port 1
Baud Rate (bps):	115200
Data Size (bits):	8
Parity:	None
Stop Bits (bits):	1
Flow Control:	None
Allow Driver Control:	Enable
Local TCP Port:	10001
Connetion Idle (Seconds):	180
Serial Data Packing	**Port 1**
Slave Timeout (ms)	1000
Packing Length (bytes)	0
Serial Ending Chars: (Number[,char1][,char2])	0
Timeout Between Chars (ms)	10
Pair-Connection Settings (Client/Server Mode)	**Port 1**
Application Mode:	Server
Remote Server IP:	Disable
Remote TCP Port:	Disable

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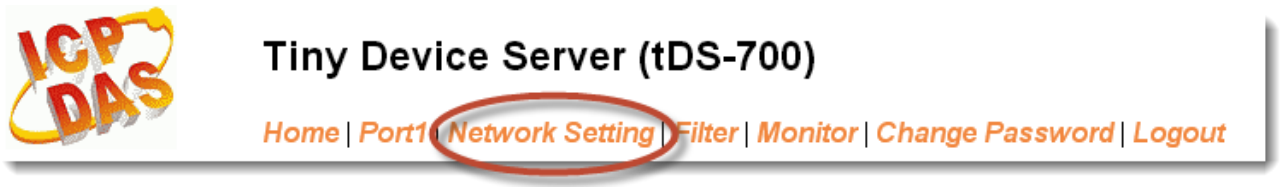
4.3 Network Setting



4.3.1 Network and Miscellaneous Settings

The **Network and Miscellaneous Settings** page provides basic details of the tDS-700 module and other information related to the hardware and software.

The software and hardware information section includes information related to the Model Name, the current Firmware version, the IP Address, the current position of the Initial Switch, the Alias, the MAC Address, and the TCP Port, and the System Timeout values. **If you update the firmware for the tDS-700 module, this page can be used to check the version information** of the tDS-700 software.

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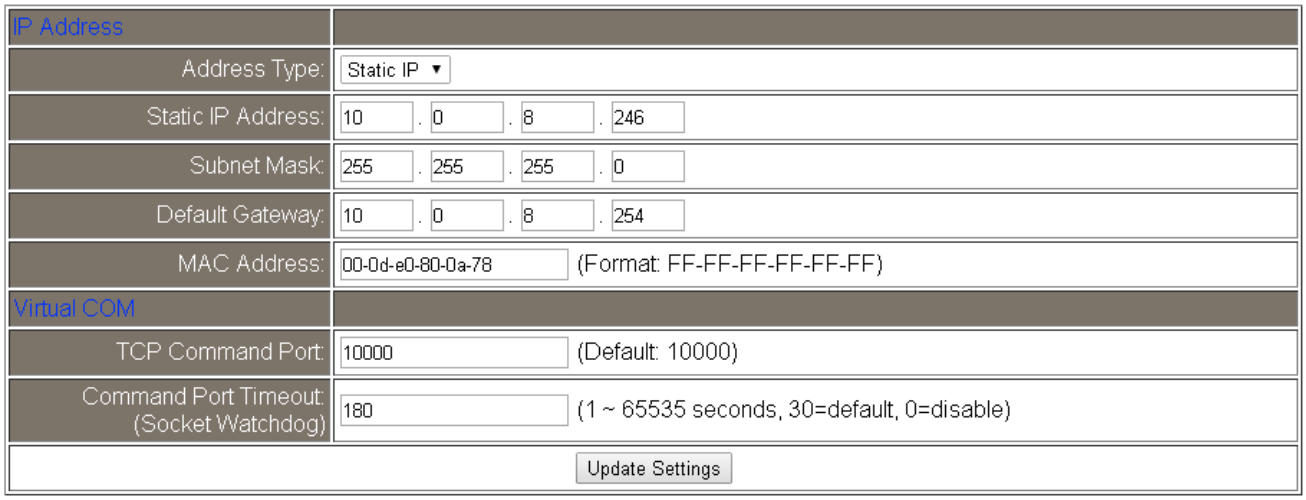
4.3.2 IP Address Settings

The **Address Type, Static IP Address, Subnet Mask** and **Default Gateway** values are the most important network settings and should always correspond to the LAN configuration. If they do not match, the tDS-700 module will not operate correctly. If the settings are changed while the module is operating, any connection currently in use will be lost and an error will occur.

IP Address Settings



The following is an overview of the parameters contained in the IP Address Settings section:

Item	Description
IP Address	
Address Type	**Static IP:** If no DHCP server is installed on the network, the network settings can be configured manually. Refer to Section 4.3.2.1 Manual Configuration for more details.
	DHCP: The Dynamic Host Configuration Protocol (DHCP) is a network application protocol that automatically assigns an IP address to each device. Refer to Section 4.3.2.2 Dynamic Configuration for more details.
Static IP Address	Each tDS-700 connected to the network must have its own unique IP address. This parameter is used to assign a specific IP address.

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Item	Description
Subnet Mask	This parameter is used to assign the subnet mask for the tDS-700 device. The subnet mask indicates which portion of the IP address is used to identify the local network or subnet.
Default Gateway	This parameter is used to assign the IP Address of the Gateway to be used by the tDS-700. A Gateway (or router) is a device that is used to connect an individual network to one or more additional networks.
MAC Address	This parameter is used to set a user-defined MAC address, which must be in the format FF-FF-FF-FF-FF-FF.
Virtual COM	
TCP Command Port	This parameter is used to configure the TCP Command Port to a custom value depending on your requirement. Note that if the TCP Command Port configuration setting is completed, the TCP port of serial port will be change, as follows: COM1= TCP Command Port + 1 COM2= TCP Command Port + 2 The default TCP Command Port is 10000, Thus, the serial COM port1/port2 is 10001/10002, and so on.
Command Port Timeout (Socket Watchdog)	If the command port does not receive any data from the TCP/IP socket for a certain period, the tDS-700 can disconnect the socket. Settings range value: 1 ~ 65535 (seconds); Default value: 30 (seconds); Disabled: 0;
Update Settings	Click this button to save the revised settings to the tDS-700.

4.3.2.1 Manual Configuration

When using manual configuration, the network settings should be assigned in the following manner:

Step 1: Select the **"Static IP"** option from the **"Address Type"** drop-down menu.

Step 2: Enter the relevant details in the respective **network settings** fields**.**

Step 3: Click the **"Update Settings"** button to complete the configuration.

※ Refer to Figure 4-1 for an illustration of how to perform the above procedure.

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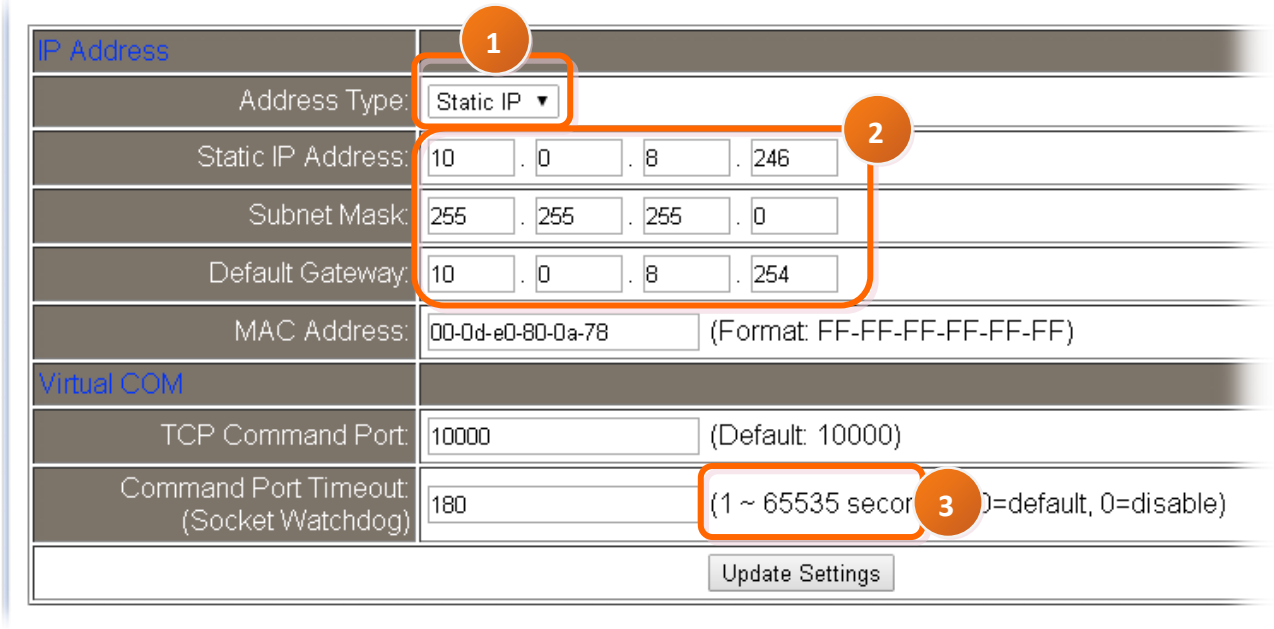

Figure 4-1

4.3.2.2 Dynamic Configuration

Dynamic configuration is very easy to perform. If a DHCP server is connected to you network, a network address can be dynamically configured by using the following procedure:

Step 1: Select the **"DHCP"** option from the **"Address Type"** drop-down menu.

Step 2: Click the **"Update Settings"** button to complete the configuration.

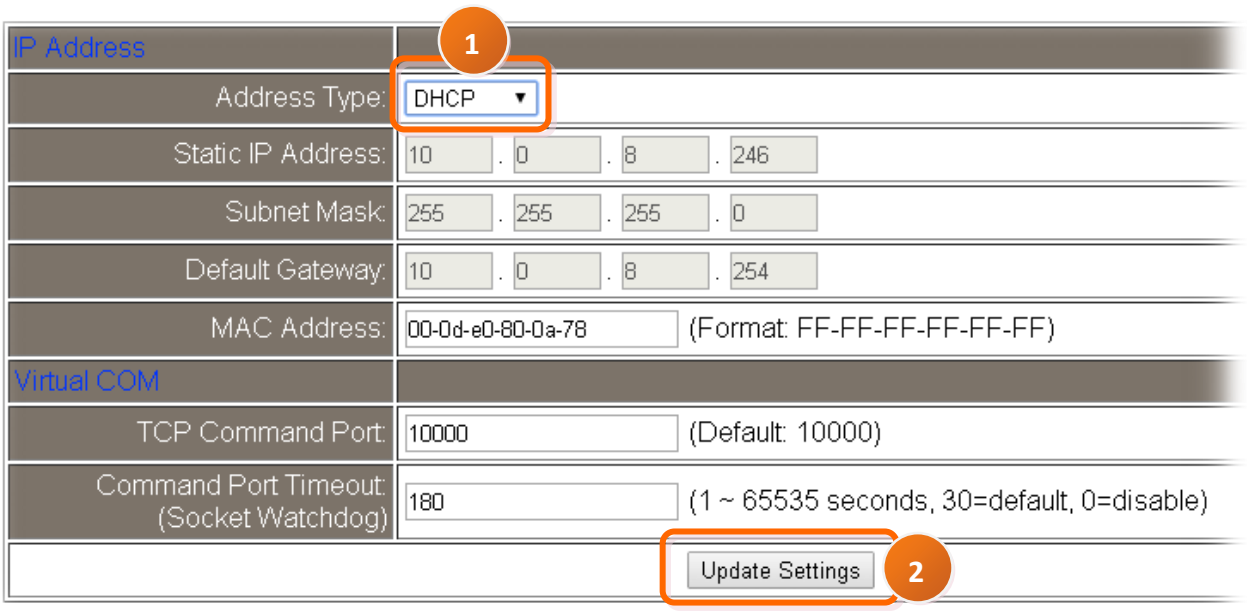

Figure 4-2

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4.3.3 General Settings

The General Settings provides functions allowing items such as the Alias Name, System Timeout value, UART Watchdog value, Auto-logout value, Debug Message and CGI Configuration to be configured.

General Settings

Network	
Ethernet Speed:	Auto (Auto=10/100 Mbps Auto-negotiation)
System Timeout: (Network Watchdog)	300 (30 ~ 65535 seconds, 300=default, 0=disable) Action=Reboot
Web Auto-logout:	10 (1 ~ 255 minutes, 10=default, 0=disable)
CGI Configuration:	Enable (Enable/Disable the assign.cgi, Enable=default.)
UDP Configuration:	Enable (Enable/Disable the UDP Configuration, Enable=default.)
UDP Alarm	
Alarm IP Address(UDP):	255 . 255 . 255 . 255
Alarm Port(UDP):	54300
Misc.	
Alias Name:	Tiny (Max. 18 chars)
UART Watchdog:	Tx: 0 Rx: 0 (30 ~ 65535 seconds, 0=default=disable) Action=Reboot
Debug Message(UDP):	20 (1 ~ 255 seconds, 20=default, 0=disable)
Update Settings	

The following is an overview of the parameters contained in the General Settings section:

Item	Description	Default
Network		
Ethernet Speed	This parameter is used to set the Ethernet speed. The default value is Auto (Auto = 10/100 Mbps Auto-negotiation).	Auto
System Timeout (Network Watchdog)	This parameter is used to configure the system timeout value. If there is no activity on the network for a specific period of time, the system will be rebooted based on the configured system timeout value. Timeout value range: 30 to 65535 (seconds); Disable = 0.	300

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Item	Description	Default
Web Auto-logout	This parameter is used to configure the automatic logout value. If there is no activity on the web server for a certain period of time, the current user account will be automatically logged out. Range: 1 to 65535 (minutes); Disable = 0.	10
CGI Configuration	The tDS-700 can be configured by CGI command. For detailed CGI command and configuration information, refer to Chapter 6 "CGI Configuration" Enable/Disable the assign.cgi.	Enable
UDP Configuration	This parameter is used to enable or disable UDP configuration function.	Enable
UDP Alarm		
Alarm IP Address (UDP)	The tDS-700 can send and UDP package (include alarm message) to specified network location (Alarm IP Address/Port).	
Alarm Port (UDP)		
Misc.		
Alias Name	This parameter is used to assign an alias for each tDS-700 device to assist with easy identification.	Tiny
UART Watchdog	If the serial port does not communication occurs for a certain period, the system will be rebooted based on the UART Watchdog value. Settings range: 30 ~ 65535 (seconds); Disable: 0.	0
Debug Message(UDP)	Reserved.	20
Update Settings	Click this button to save the revised settings to the tDS-700 device.	

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4.3.4 Restore Factory Defaults

Restore Factory Defaults

Restore all options to their factory default states:	Restore Defaults

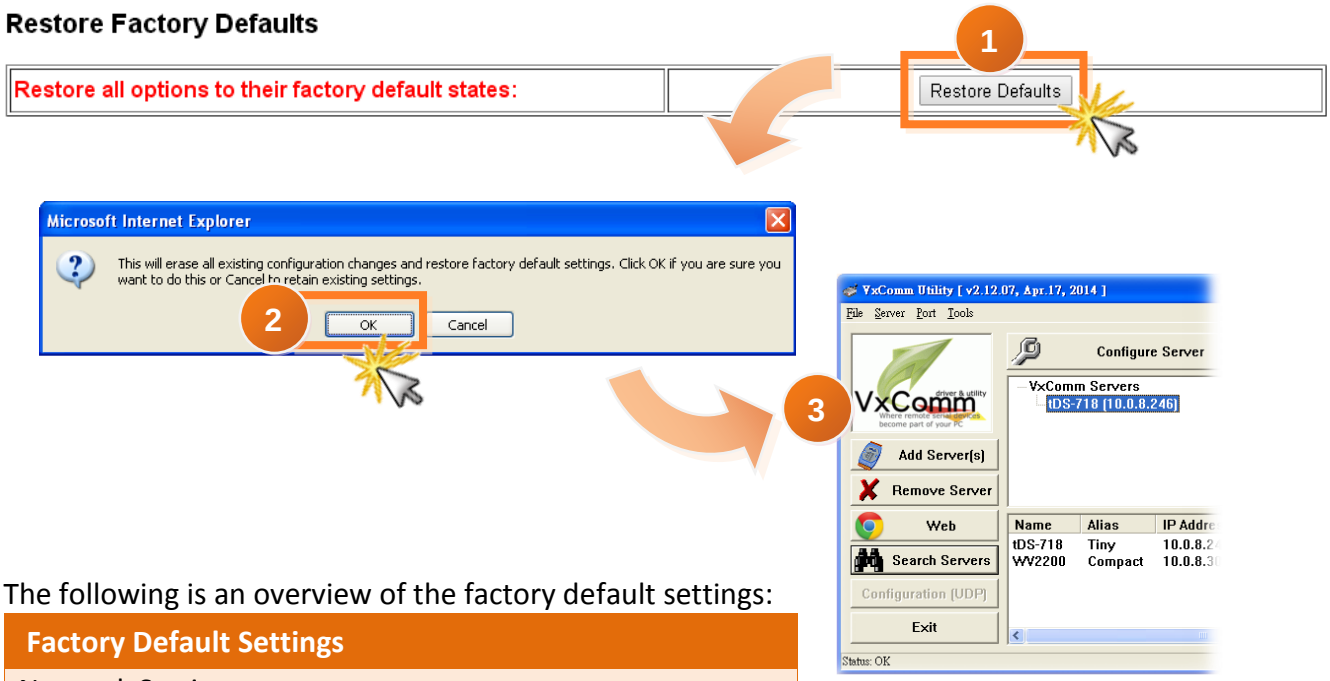
Forced Reboot	Reboot

➢ Use the following procedure to reset all parameters to their original factory default settings:

Step 1: Click the **"Restore Defaults"** button to reset the configuration.

Step 2: Click the **"OK"** button in the message dialog box.

Step 3: Check whether the module has been reset to the original factory default settings for use with the VxComm Utility. Refer to Chapter 3 Setting up the tDS-700 Module for more details.



The following is an overview of the factory default settings:

Factory Default Settings	
Network Settings	
IP Address	192.168.255.1
Gateway Address	192.168.0.1
Subnet Mask	255.255.0.0
DHCP	Disabled
Basic Settings	
Alias	Tiny

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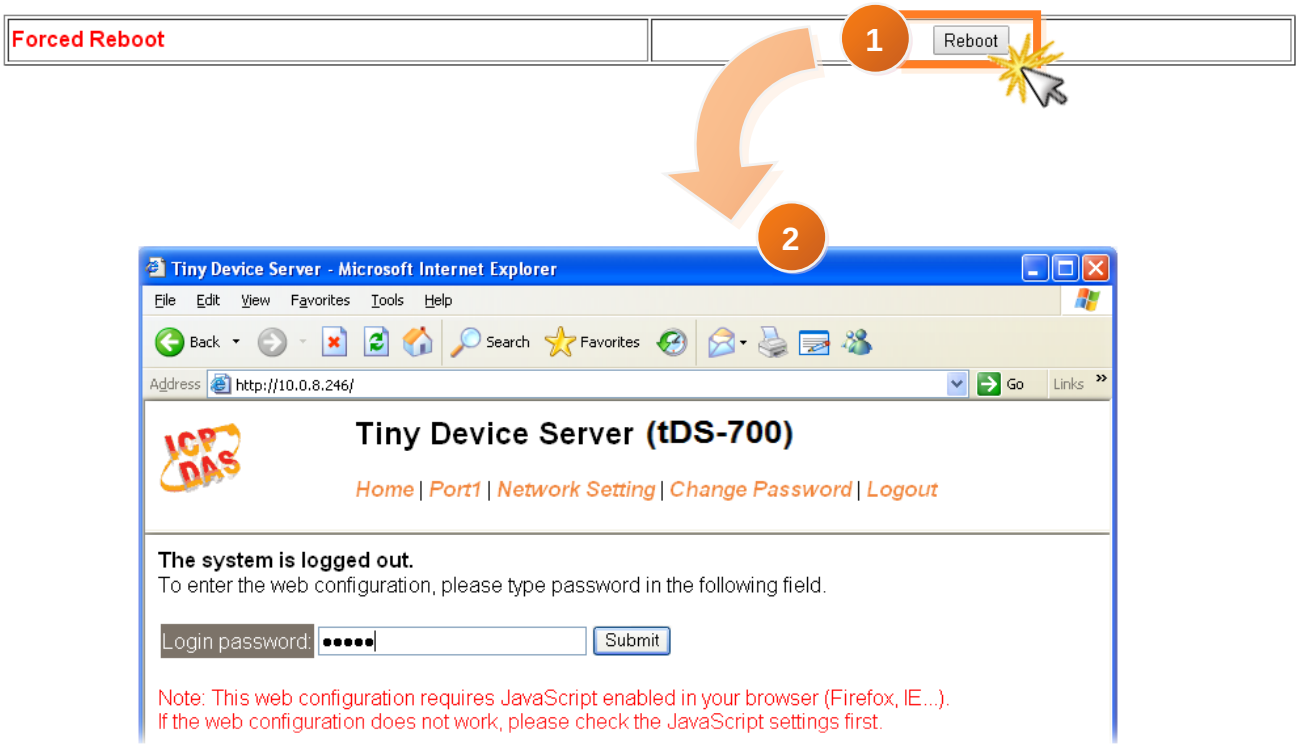
- The **Forced Reboot** function: can be used to force the tDS-700 to reboot or to remotely reboot the device. After the tDS-700 module has rebooted, the original login screen will be displayed requesting that you enter your Login Password before continuing.


Forced Reboot
1
Reboot
2
Tiny Device Server - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites
Address http://10.0.8.246/
Go Links
Tiny Device Server (tDS-700)
Home | Port1 | Network Setting | Change Password | Logout
The system is logged out.
To enter the web configuration, please type password in the following field.
Login password:
Submit
Note: This web configuration requires JavaScript enabled in your browser (Firefox, IE...).
If the web configuration does not work, please check the JavaScript settings first.

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4.3.5 Firmware Update

The **Firmware update** function is only supported by the **firmware version is v1.3.8 [Sep.30, 2014] or later** that can be not need to manually adjust the Init/Run Switch and reboot the tDS-700 to update the firmware.

For detailed information regarding how to use this function to update the Firmware for your tDS-700 series module, refer to the **tDS_Firmware_v138_and_later_Update_vxxx_en.pdf.**

The location of the user manual on the CD and the download address are shown below:

	CD:\\ NAPDOS\tDS-700\Firmware\
	http://ftp.icpdas.com/pub/cd/tinymodules/napdos/tds-700/firmware/

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4.4 Serial Port Page

The Port 1 Settings section provides basic information related to the hardware and software for the tDS-700 series module, including the Firmware version and the IP Address, etc. and then provides functions allowing items such as port settings, serial data packing and pair-connection settings to be configured.

4.4.1 Port1 Settings

Port 1 Settings

Model Name:	tDS-718	Alias Name:	0457_s
Firmware Version:	v1.3.8 [Nov.03, 2014]	MAC Address:	00-0d-e0-80-00-6b
IP Address:	10.0.8.246	TCP Command Port:	10000
Initial Switch:	OFF	System Idle: (Seconds)	300

Port Settings	Current	Updated
Baud Rate (bps):	115200	115200 ▾ bits/S
Data Size (bits):	8	8 ▾ bits/character
Parity:	None	None ▾
Stop Bits(bits):	1	1 ▾
Flow Control:	None	None ▾
Allow Driver Control:	Enable	Enable ▾
Operation Mode:	0	0 ▾ (0=Data-sharing, 1=Non-sharing)
Local TCP Port:	10001	(=TCP Command Port +1)
Connetion Idle (seconds):	180	180 (1 ~ 65535, 180=default, 0=disable)
Serial Data Packing	Current	Updated
Slave Timeout (ms):	1000	1000 (After last TX)
Packing Length(bytes):	0	0 (0 ~ 1024, 0=default=disable)
Serial Ending Chars: (Number[,char1][,char2])	0	0 (e.g.: 2,0x0D,0x0A)
Timeout Between Chars (ms):	10	10 (After last RX) (10 ~ 65535, 10=default, 0=disable)
Pair-Connection Settings (Client/Server Mode)	Current	Updated
Application Mode:	Server	Server ▾ (Server=Slave, Client=Master)
Remote Server IP:	Disable	0 . 0 . 0 . 0
Remote TCP Port:	Disable	10001
		Submit

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The following is an overview of the parameters contained in the Port1 Settings section:

Item	Description	Default
Port Settings		
Baud Rate (bps)	This parameter is used to set the Baud Rate for the COM ports.	115200
Data Size (bits)	This parameter is used to set the Data Size for the COM ports.	8
Parity	This parameter is used to set the Parity for the COM ports.	None
Stop Bits (bits)	This parameter is used to set the Stop Bits for the COM ports.	1
Flow Control	This parameter is used to set the Flow Control for the COM ports.	None
Allow Driver Control (Original Name: Dynamic Serial Setting)	Enable client (VxComm Driver) to dynamically change the data format and baud rate settings.	Enable
Operation Mode	**M0/Multi-echo**: Share received serial data between clients. **M1/Single-echo**: Send received serial data to the requested client only. 0 = Data-sharing; 1 = Non-sharing	0
Local TCP Port	TCP Command Port +1 Note: COM1/COM2/COM3 = TCP port 10001/10002/10003	10001
Connection Idle (seconds) (Original Name: TCP Timeout)	If the Local TCP port does not receive any data via the TCP/IP for a certain period, the tDS-700 will disconnect the socket based on the TCP timeout value. Settings range: 1 ~ 65535 (seconds); Disabled: 0;	180
Serial Data Packing		
Slave Timeout (ms)	Set the waiting time after last Tx of the request sent to the device. If the device does not respond within the timeout value, the tDS-700 will return existing data via TCP package and process next request.	1000

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Item	Description	Default
Packing Length (bytes)	When the input serial data length reaches to the value, it will be sent out. Settings range: 0 ~ 1024; Disabled: 0.	0
Serial Ending Chars (Number[,char1][,char2])	The tDS-700 outputs an Ethernet packet immediately after the ending-chars pattern is identified from the incoming serial data. The number of ending-chars can be 0 (disabled), 1 or 2 chars. Disabled=0; 1 char: **1,0x0D**; 2 chars: **2,0x0D, 0x0A**	0
Timeout Between Chars (ms)	Set the waiting time after Rx of the response sent from the device. If the device does not respond within the timeout value, the tDS-700 will process this response. Settings range: 10 ~ 65535; Disabled: 0.	10

Pair-Connection Settings (Client/Server Mode)		
Application Mode (Original Name: Server Mode)	Server	Client
Remote Server IP	-	IP address of the remote device
Remote TCP Port	-	TCP Port number of the remote device
Submit	Click this button to save the revised settings to the tDS-700.	

Note: The more detailed information regarding pair-connection applications settings, please refer to the section 5.4 “Pair-Connection Applications".

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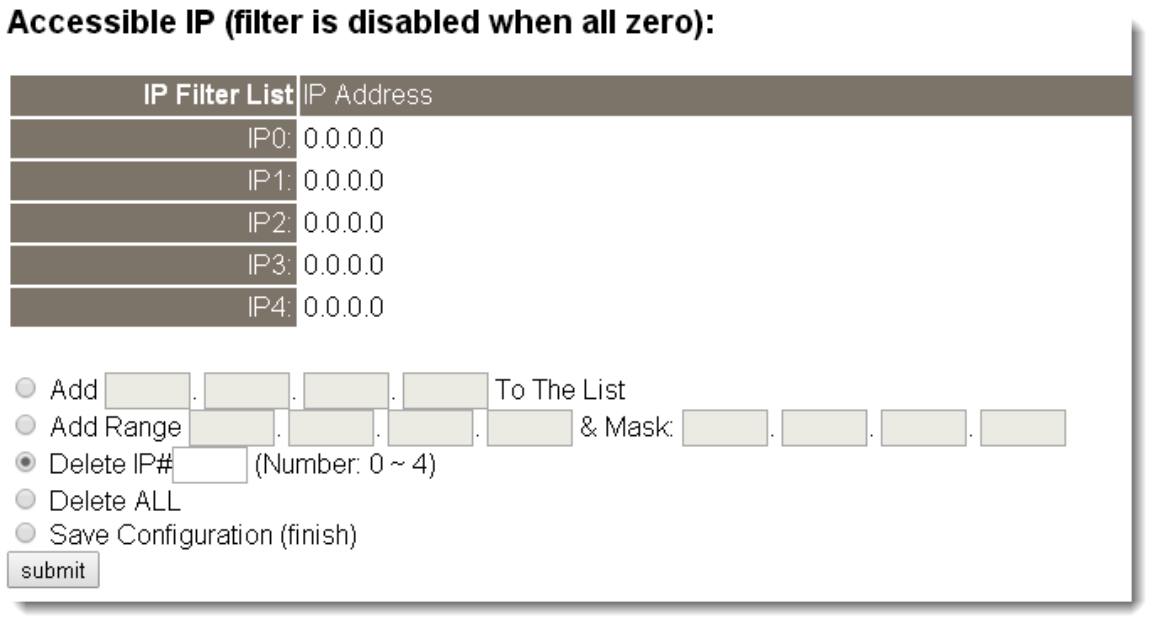
4.5 Filter Page

4.5.1 Accessible IP Settings (white list)

The Accessible IP Settings section is used to query or edit the IP Filter List. The IP Filter List restricts the access of packets based on the IP header. If one or more IP address are saved to the IP Filter table, only clients whose IP is specified in the IP Filter List can access the tDS-700.



The following is an overview of the parameters contained in the Filter Settings (white list) section:

Item	Description
Add "IP" To The List	Add an IP address to the IP Filter List.
Add Range "IP"& Mask "IP"	Add an IP address range to the IP Filter List.
Delete IP# "Number"	Delete a specific IP# address from the IP Filter List. (Number: 0 ~ 4)
Delete All	Delete all items from the IP Filter List.
Save Configuration (finish)	Save a new IP Filter List to the Flash memory.
Submit	Click this button to save the revised settings to the tDS-700.

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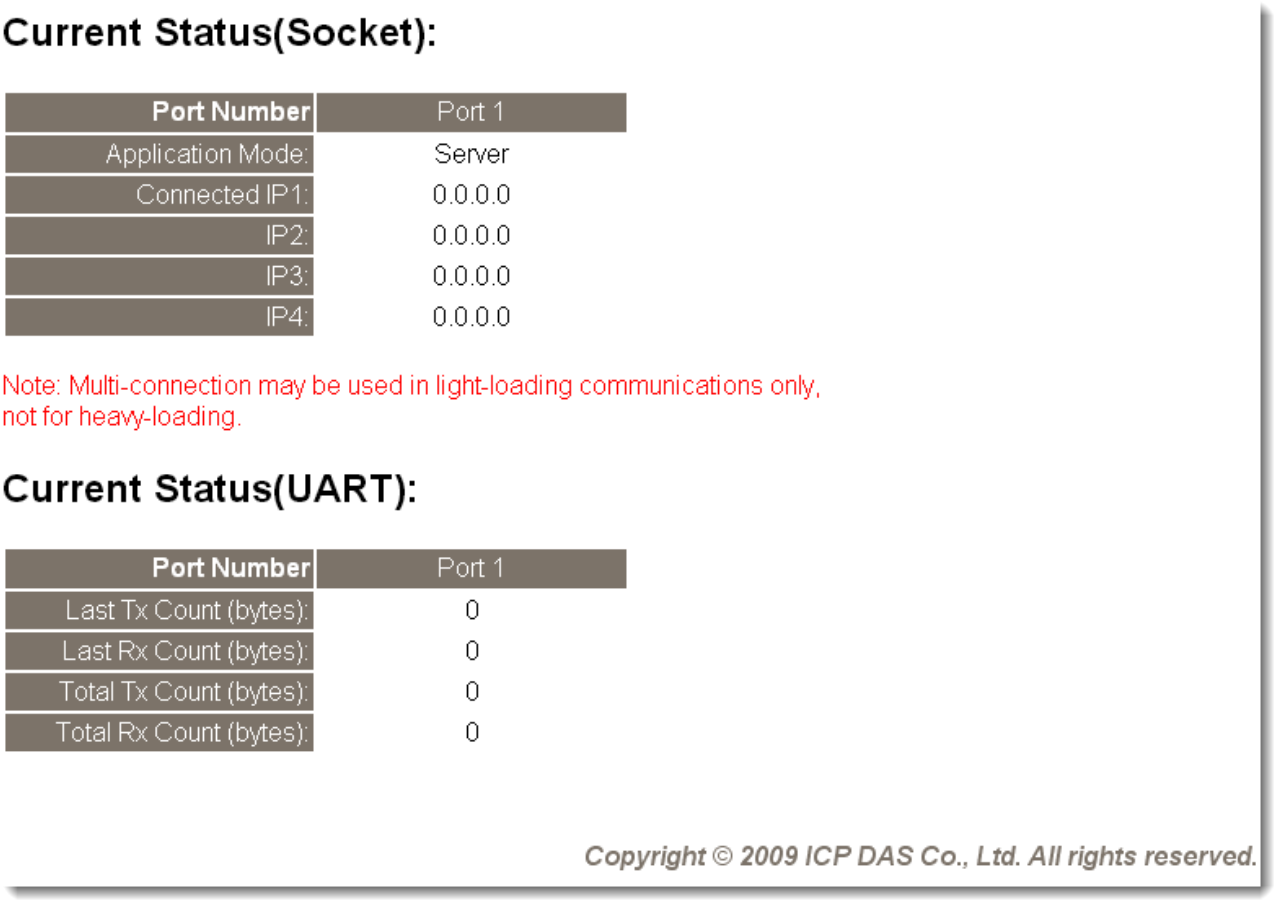
4.6 Monitor Page

After clicking the **Monitor** tab, the Current Connection Status page will be displayed showing detailed information regarding the current status of the serial port connection settings for the tDS-700 module.



Current Status(Socket):

Port Number	Port 1
Application Mode:	Server
Connected IP1:	0.0.0.0
IP2:	0.0.0.0
IP3:	0.0.0.0
IP4:	0.0.0.0

Note: Multi-connection may be used in light-loading communications only, not for heavy-loading.

Current Status(UART):

Port Number	Port 1
Last Tx Count (bytes):	0
Last Rx Count (bytes):	0
Total Tx Count (bytes):	0
Total Rx Count (bytes):	0

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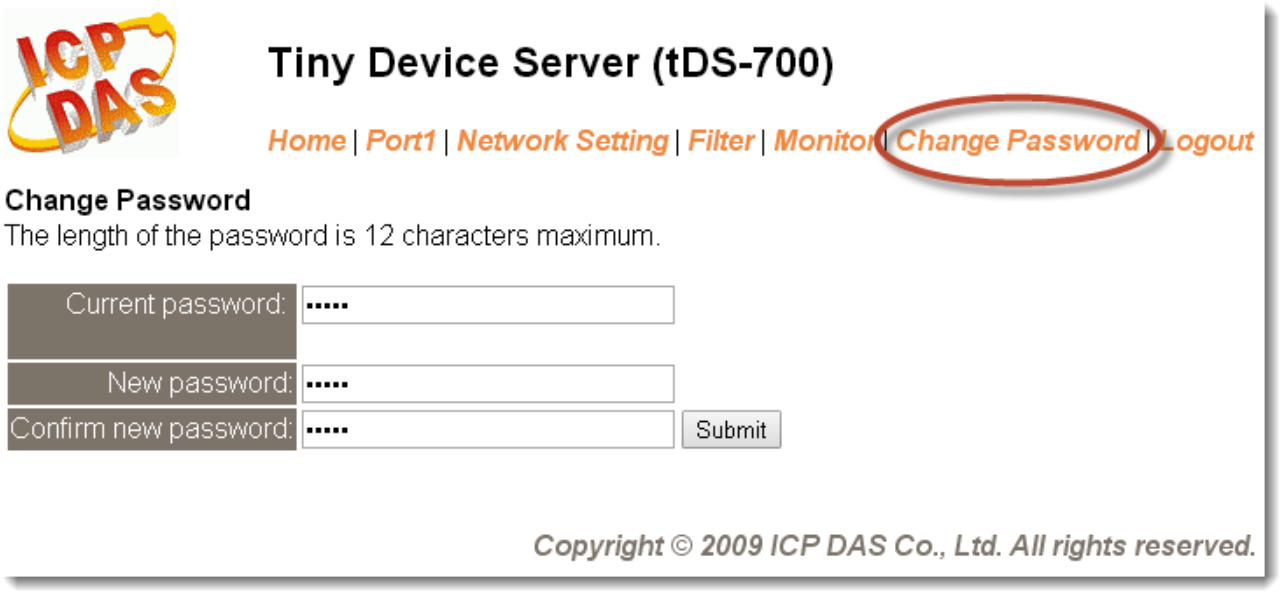
4.7 Change Password

After clicking the **Password** tab, the **Change Password** page will be displayed. To change a password, first enter the old password in the **"Current password"** field (use the default password **"admin"**) and then enter a new password in the **"New password"** field. Re-enter the new password in the **"Confirm new password"** field, and then click the "**Submit**" button to update the password.


Tiny Device Server (tDS-700)
Home | Port1 | Network Setting | Filter | Monitor | Change Password | Logout
Change Password
The length of the password is 12 characters maximum.
Current password:
New password:
Confirm new password:
Submit
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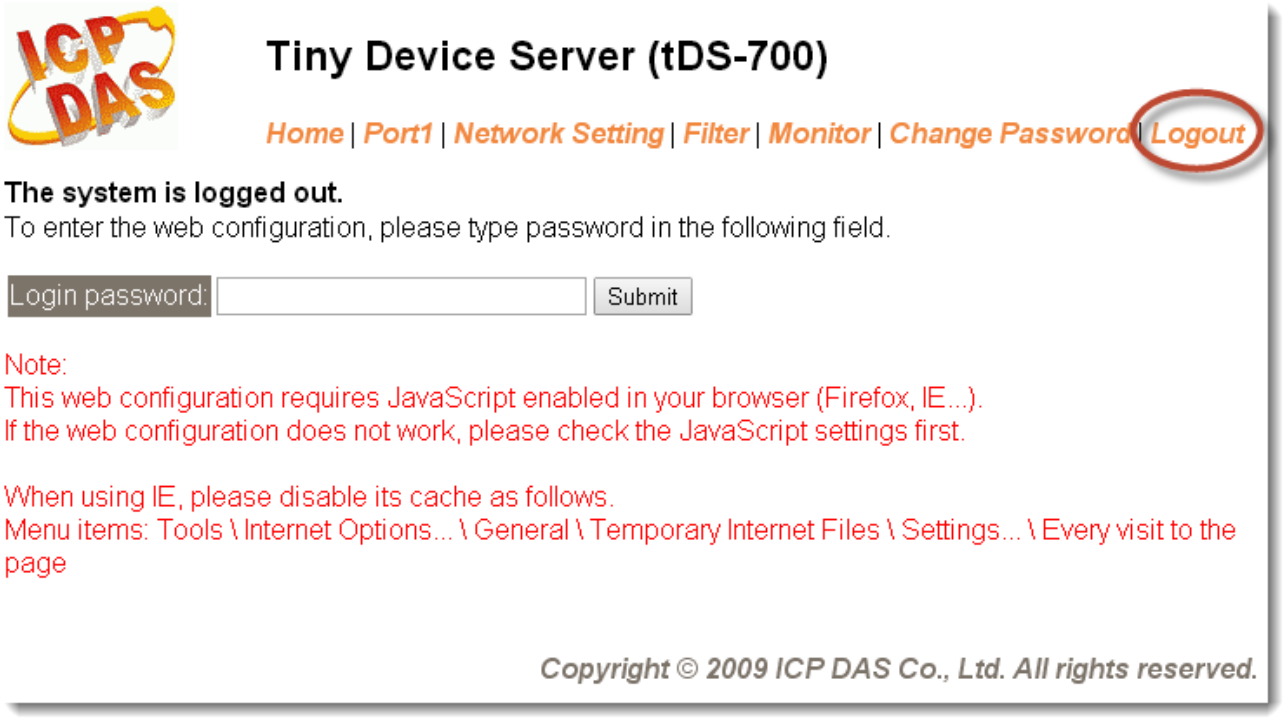
4.8 Logout Page

After clicking the **Logout** tab, you will be immediately logged out from the system and be returned to the login page.


Tiny Device Server (tDS-700)
Home | Port1 | Network Setting | Filter | Monitor | Change Password | Logout
The system is logged out.
To enter the web configuration, please type password in the following field.
Login password:
Submit
Note:
This web configuration requires JavaScript enabled in your browser (Firefox, IE...).
If the web configuration does not work, please check the JavaScript settings first.
When using IE, please disable its cache as follows.
Menu items: Tools \ Internet Options... \ General \ Temporary Internet Files \ Settings... \ Every visit to the page
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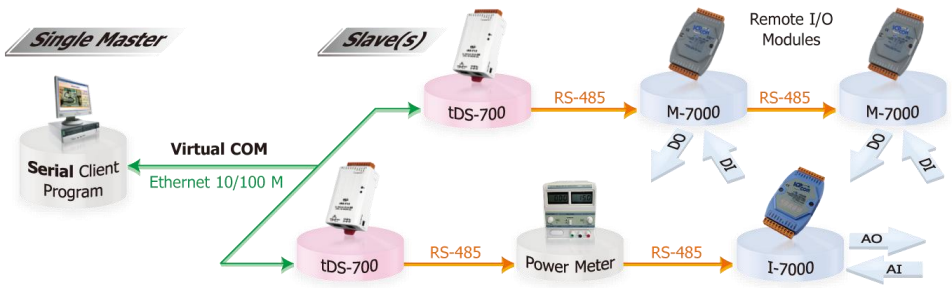
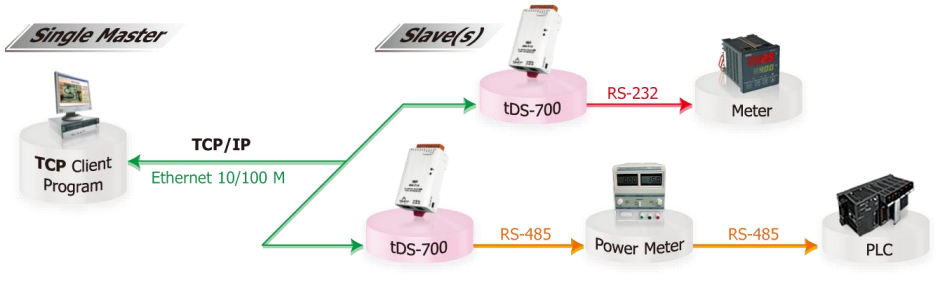
5. Typical Applications

This chapter provides some examples of typical scenarios for the tDS-700 module, including applications focused on the Virtual COM, Direct Socket Connection, Ethernet I/O, Pair-connection and TCP Client Mode, etc..

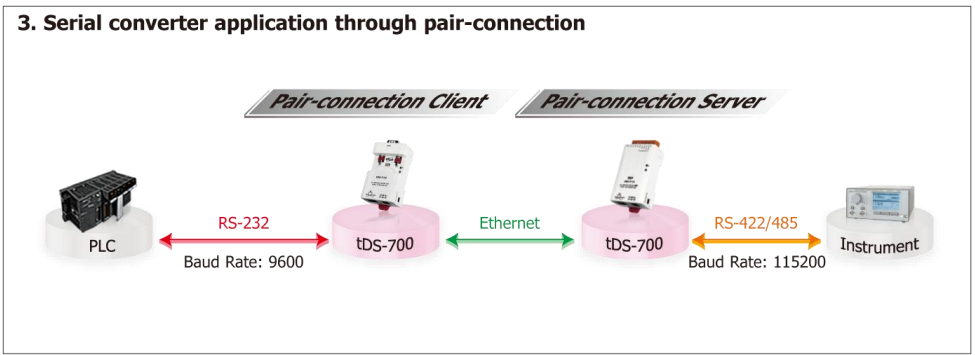
1. Access serial device via Virtual COM ports



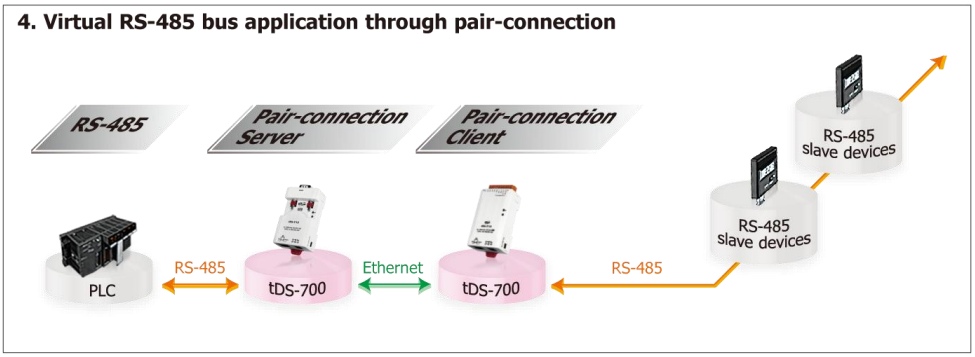
2. Access serial device via TCP/IP socket connection



3. Serial converter application through pair-connection



4. Virtual RS-485 bus application through pair-connection



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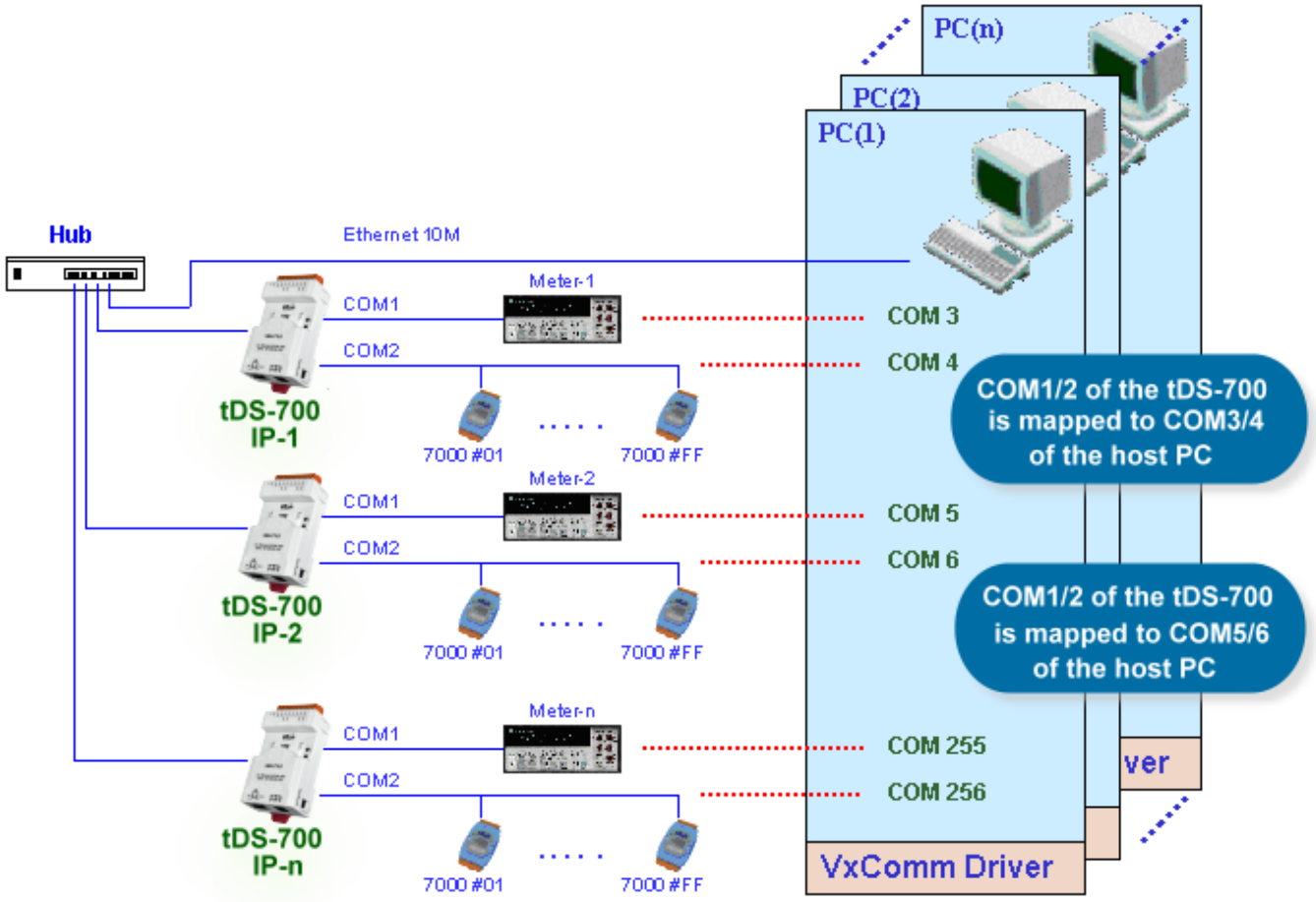
5.1 Virtual COM Application

The tDS-700 series is designed to link RS-232/422/485 devices to an Ethernet network. The VxComm utility allows the built-in tDS-700 COM Port to be virtualized to a standard COM Port of a host PC, as shown below:



In the configuration above, Meter-1 is virtualized to link to COM3 of the host PC. Therefore, a program originally designed for the MS-COMM standard can access the meter without the need for any modification.

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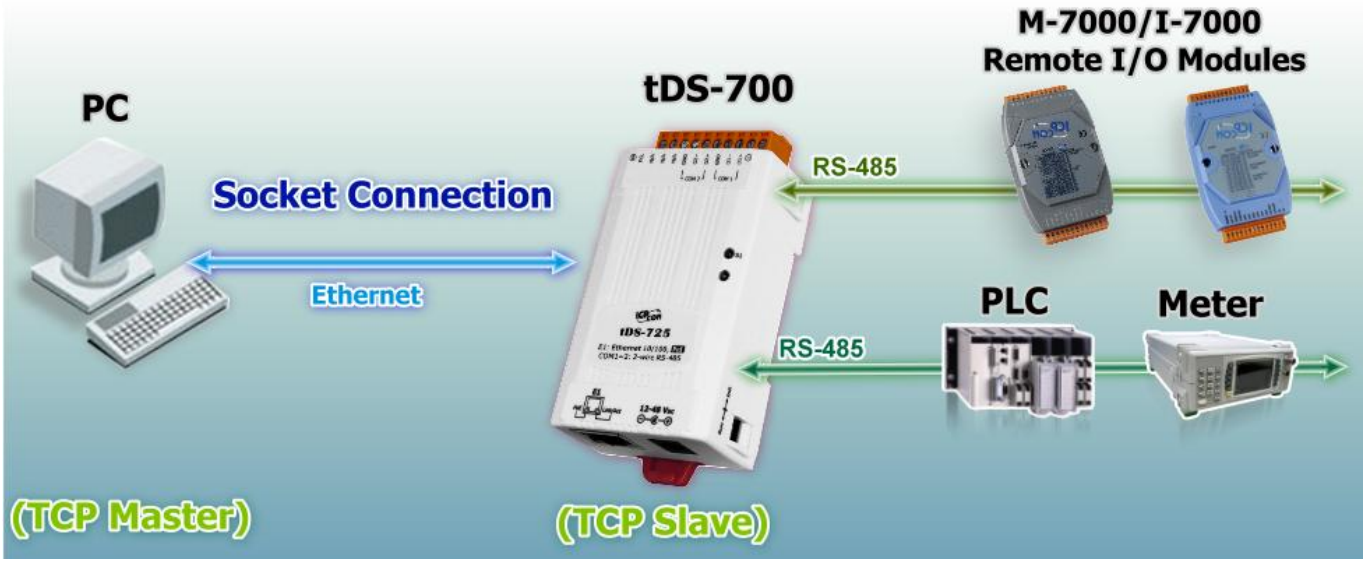
5.2 Direct Socket Connection Applications



tDS-700 series module can accept the TCP connection (include raw data) directly, it also can communicate with TCP client and Serial Device in this way.

For examples of socket connection test as follows:

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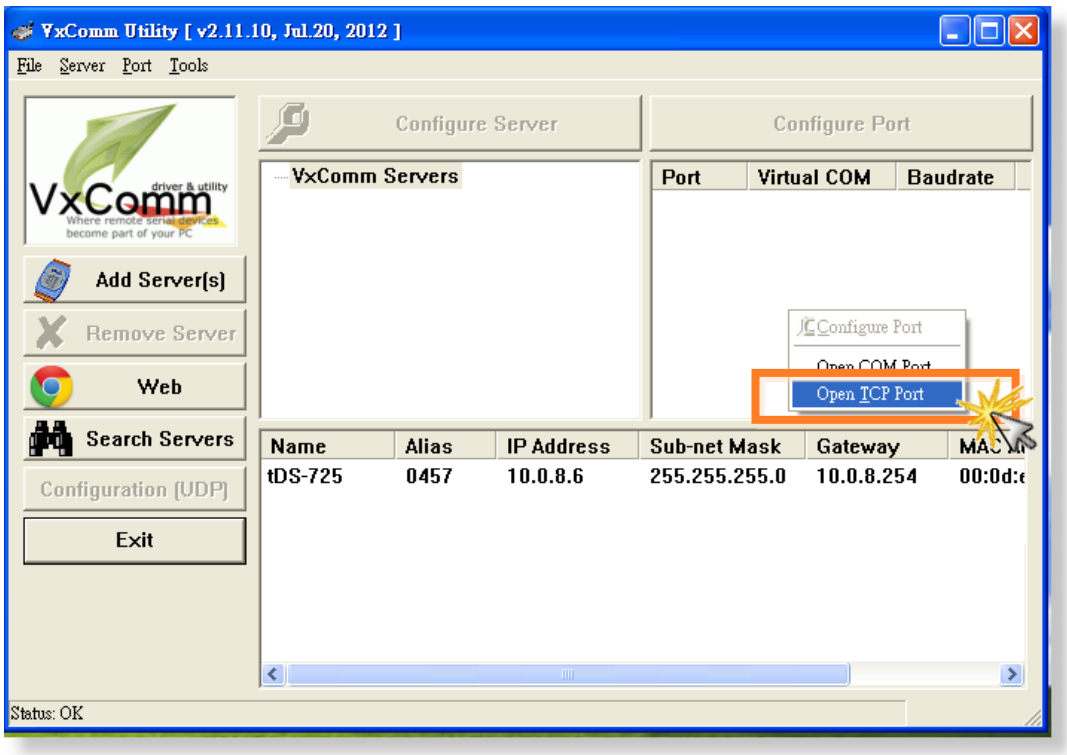
1. Confirm that the tDS-700 modules are functioning correctly. Refer to Chapter 3 Setting up the tDS-700 module for more details.
2. Wire the slave device (Ex: M-7015, optional) with your tDS-700. For detailed RS-422/485 wiring information, refer to section 2.7 “Wiring Notes for RS-232/485/422 Interfaces”.
3. Supply power to the slave device (Ex, M-7015, Device ID: 2, +10~+30 VDC power used.)
4. Install VxComm utility, and then configuration Ethernet setting (**such as IP/Mask/Gateway details)** for tDS-700 series module; refer to Chapter 3 Setting up the tDS-700 module.
5. Confirm the serial port settings (**baud Rate and data format**) must be the same between the tDS-700 and slave device (M-7015).
   For example:

Model	Port Settings		TCP Port
	Baud Rate	Data Format	
tDS-700	9600	8,N,1	10001
Slave Device (M-7015)	9600	8,N,1	-

6. Right click in the “**Configure Port**” area and then choose the **“Open TCP Port”** item under the VxComm utility.



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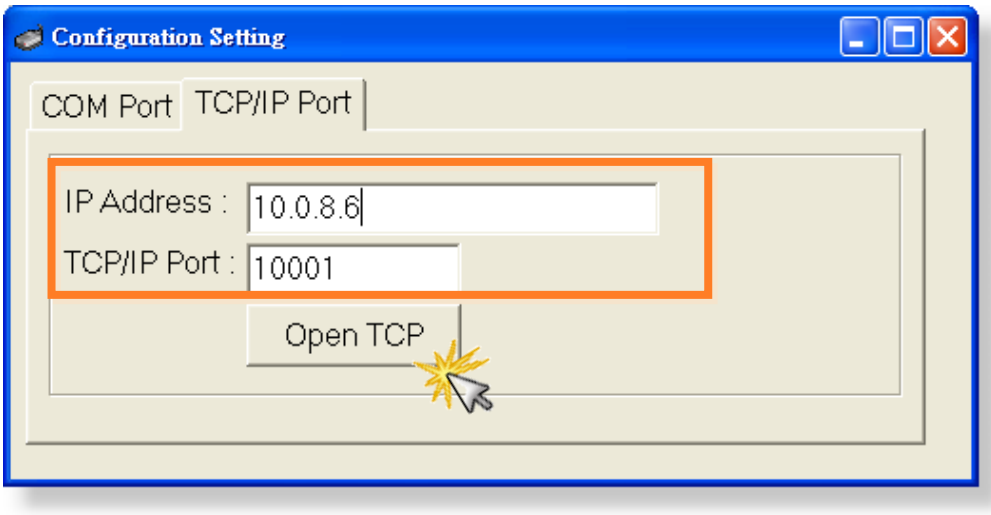
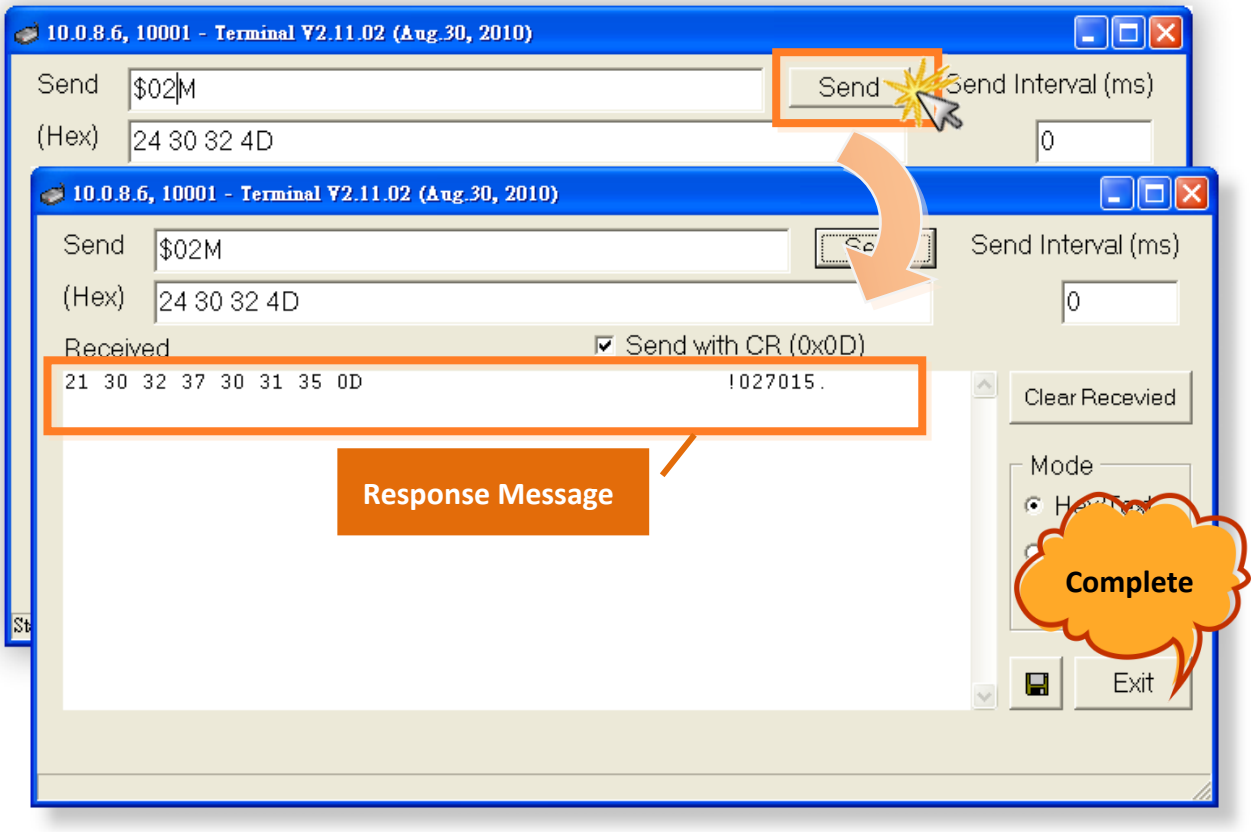
7. Type the **IP address of tDS-700** in the IP Address field and assign a **TCP/IP port of tDS-700**, and then click the "**Open TCP**" button.



8. Type a string in the send field then click the **"Send"** button. If a response is received, it will be displayed in the received field.



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5.3 Ethernet I/O Applications

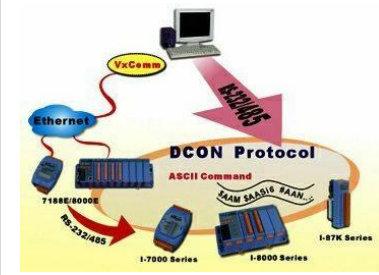
Linking to I-7000 series modules

The I-7000 series provides a variety of I/O operations, such as D/I, D/O, A/D, D/A, Counter and Frequency Measurement, etc. The I-7000 series was originally designed to be used with RS-485 networks, so the RS-485 of COM on the tDS-700 can be used to link to I-7000 series modules.

By using VxComm technology, programs that support serial devices on the host PC can be upgraded from an RS-485 network to an Ethernet network without requiring any modifications to the program.

Configurable Ethernet Data Logger

Using the VxComm driver, the tDS-700 + 7000 modules can be virtualized to become COM Port + 7000 modules located on the host PC, and then the Data Logger in the DCON Utility can be used to access data related to the I-7000 from the Ethernet. Signal data originating from the I-7000 modules can be analyzed using MS Excel without the need to write any custom programs.



1: The DCON utility includes a log function, as show below:

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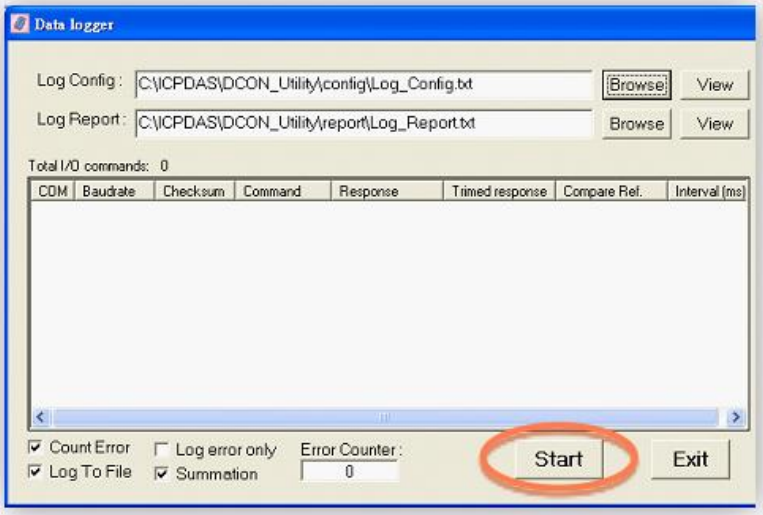
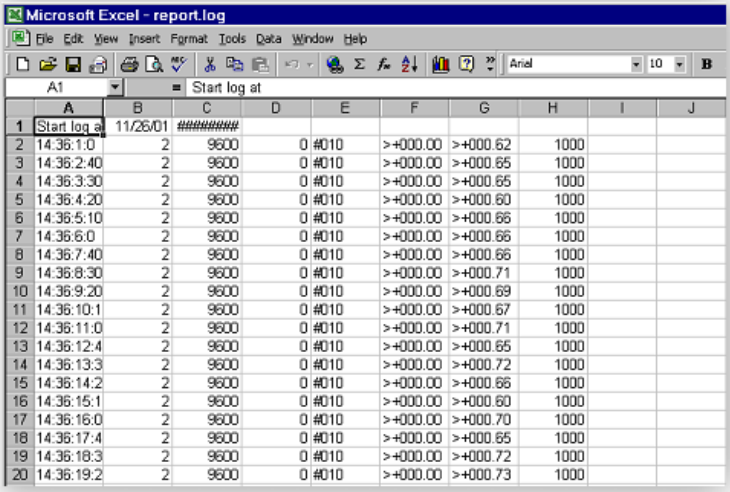
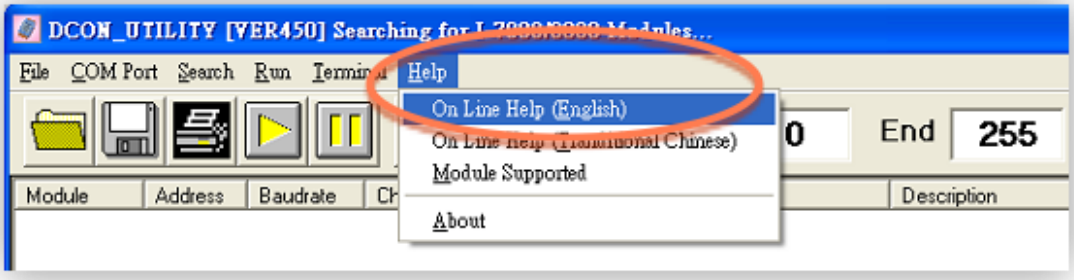
2: Configure the system connection as shown below and click the **"Start"** button to begin logging data.



3: Open the log file in MS Excel to view the log data as shown in the example below:



By using the I-7000 DCON utility and MS Excel in conjunction with **VxComm technology**, the signal data originating from I-7000 modules via the Ethernet network can be analyzed without the need to write custom programs. For more information about the **log function**, refer to the online help feature (English and Traditional Chinese) of the DCON utility.



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5.4 Pair-connection Applications

tDS-700 device servers can be used to create a pair-connection application (as well as serial-bridge or serial-tunnel), and then route data between two serial devices via TCP/IP, which is useful when connecting mainframe computers, servers or other serial devices that do not themselves have Ethernet capability.

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The following are examples of pair-connection tests:

Pair-connection Settings:

Model	Port Settings (default)		Pair-connection Settings		
	Baud Rate	Data Format	Application Mode	Remote Server IP	Remote TCP Port (default)
tDS-700 #1	115200	8N1	Client	IP Address of tDS-700 #2	10001
tDS-700 #2	115200	8N1	Server	-	-

Note:
The Baud Rate and Data Format settings of the client and server (tDS-700 #1 and #2) depend on the COM ports of the PC (or the connected device). The serial port settings between tDS-700 #1 and tDS-700#2 can be different.

Follow the procedure described below:

Step 1: Connecting to a network, PC and Power

1. Confirm that the tDS-700 modules are functioning correctly. Refer to Chapter 3 Setting up the tDS-700 module for more details.
2. Use a DN-09-2F wiring terminal board to connect COM1 of the PC to COM1 of the tDS-700 #1. For detailed RS-232 wiring information, refer to section 2.7 “Wiring Notes for RS-232/485/422 Interfaces”.
   (DN-09-2F Web site: http://www.icpdas.com/products/DAQ/screw_terminal/dn_09_2.htm)
3. Use a i-7520 module to connect COM2 of PC to COM1 of the tDS-700 #2. For detailed RS-422/485 wiring information, refer to section 2.7 “Wiring Notes for RS-232/485/422 Interfaces”.
   (i-7520 Web site: http://www.icpdas.com/products/Remote_IO/i-7000/i-7520.htm)

※ Refer to Figure 5-1 for an illustration of how to perform the above steps.

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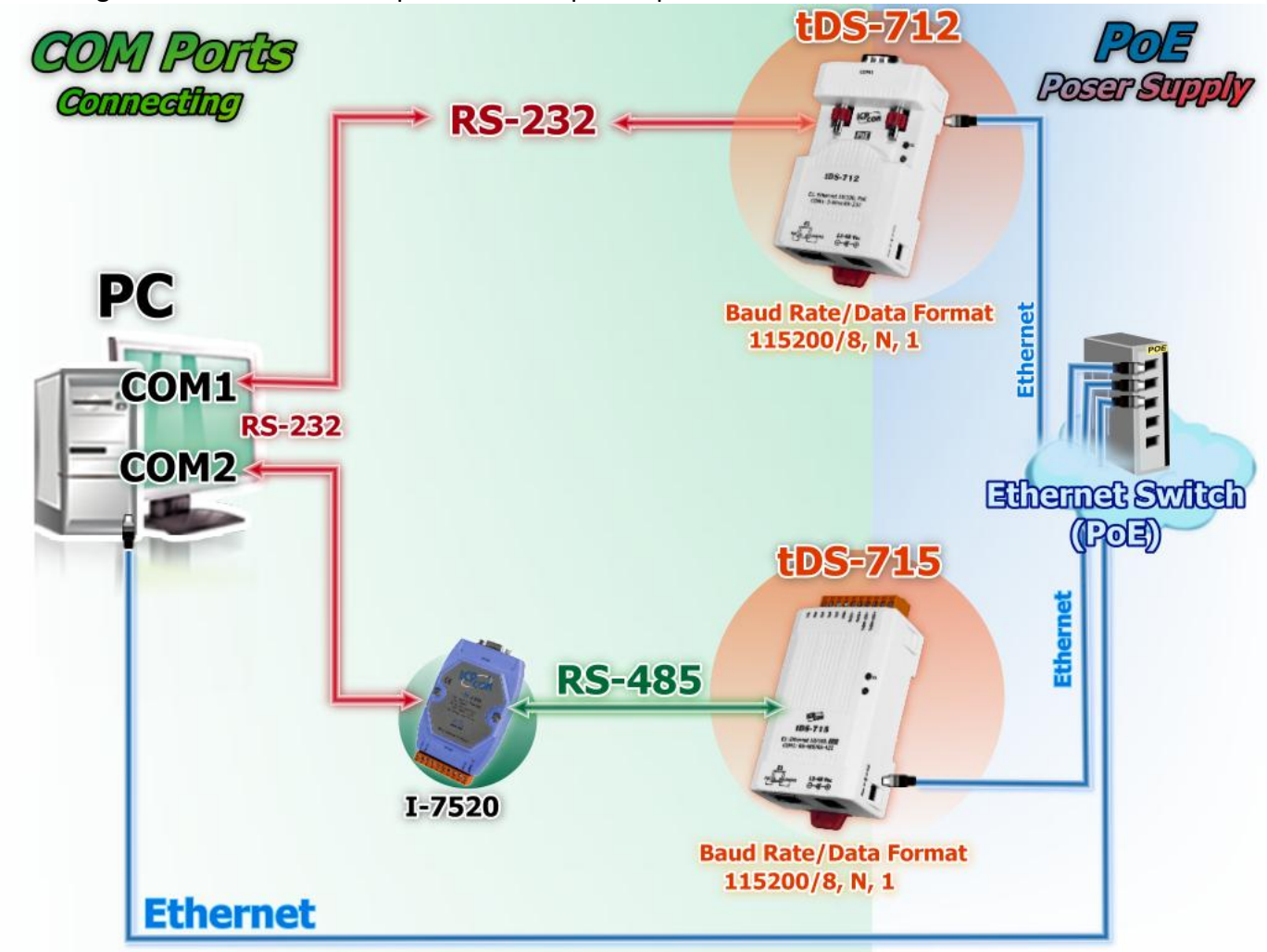
The image below shows an example of the setup for a pair-connection test: Figure 5-1



Step 2: Configuring the Ethernet Settings

Contact your Network Administrator to obtain the correct and functioning network configuration for the tDS-700 modules (including the **IP Address, Mask and Gateway details)**. Also refer to Chapter 3 Setting up the tDS-700 Module for more details.

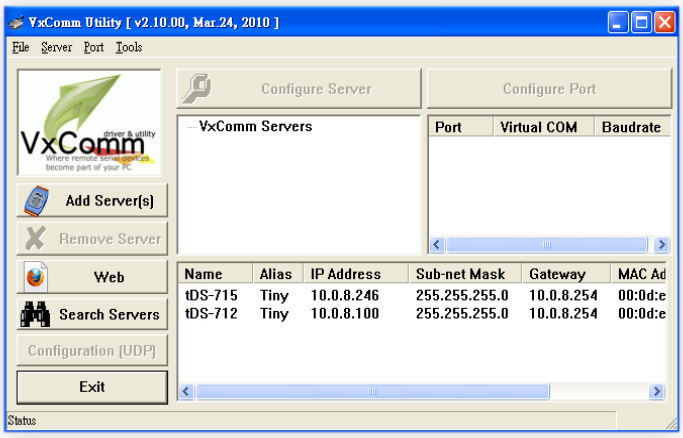


Figure 5-2

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Step 3: Configuring the Pair-connection (Client Mode) on the Web Server for tDS-700 #1

1. Enter the password (**default: admin**) in the Login password field, and then click the **"Submit"** button to enter the configuration page.

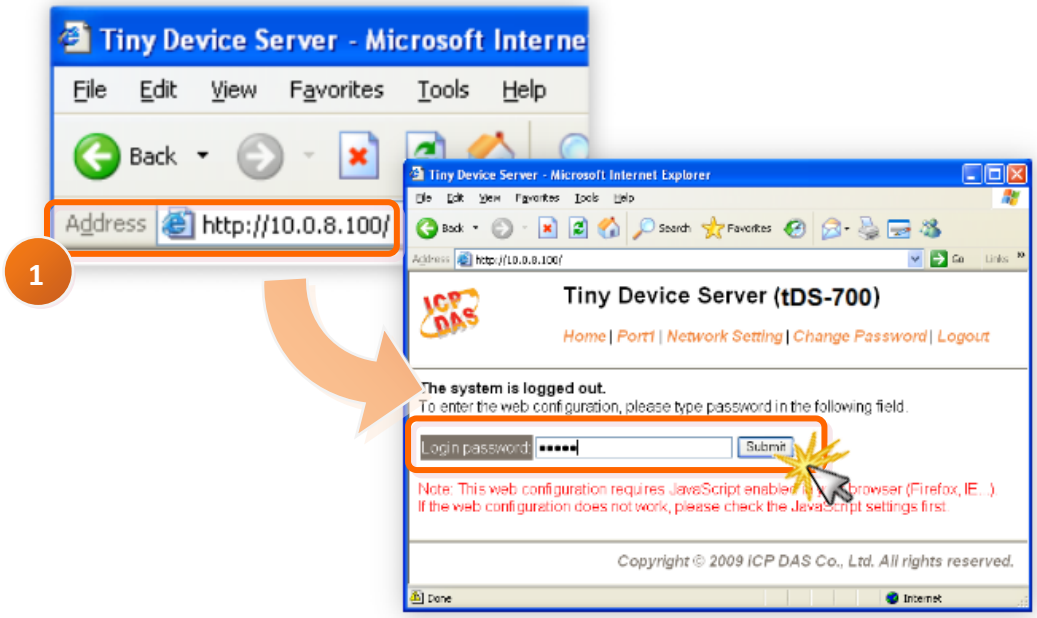
Tiny Device Server - Microsoft Interne
File Edit View Favorites Tools Help
Back
Address http://10.0.8.100/
1
Tiny Device Server - Microsoft Internet Explorer
Tiny Device Server (tDS-700)
Home | Port1 | Network Setting | Change Password | Logout
The system is logged out.
To enter the web configuration, please type password in the following field.
Login password
Submit
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Figure 5-3

2. Click the **"Port1"** tab to display to the **Port1 Settings** page.

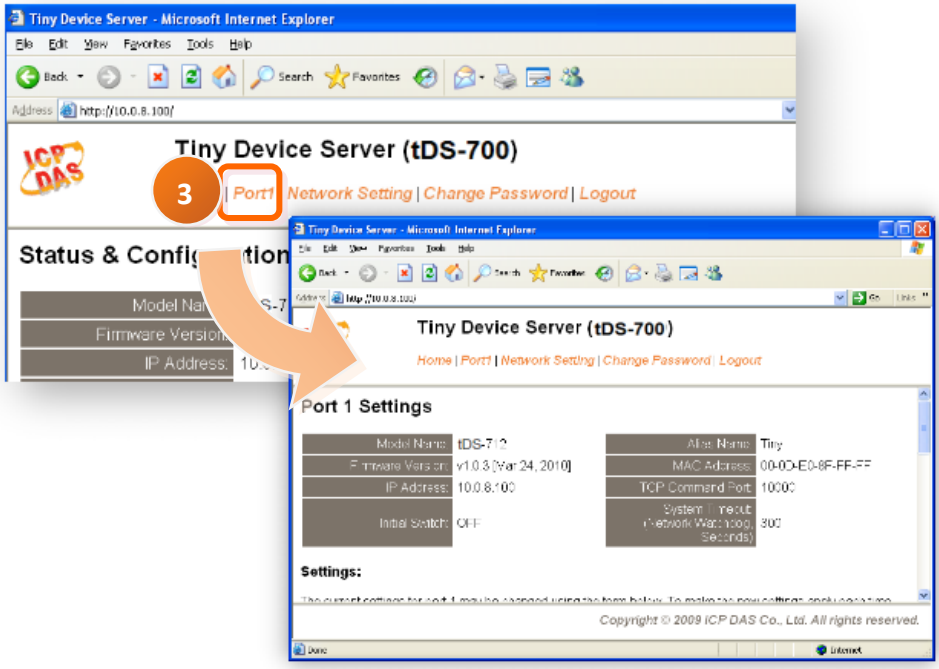

Figure 5-4

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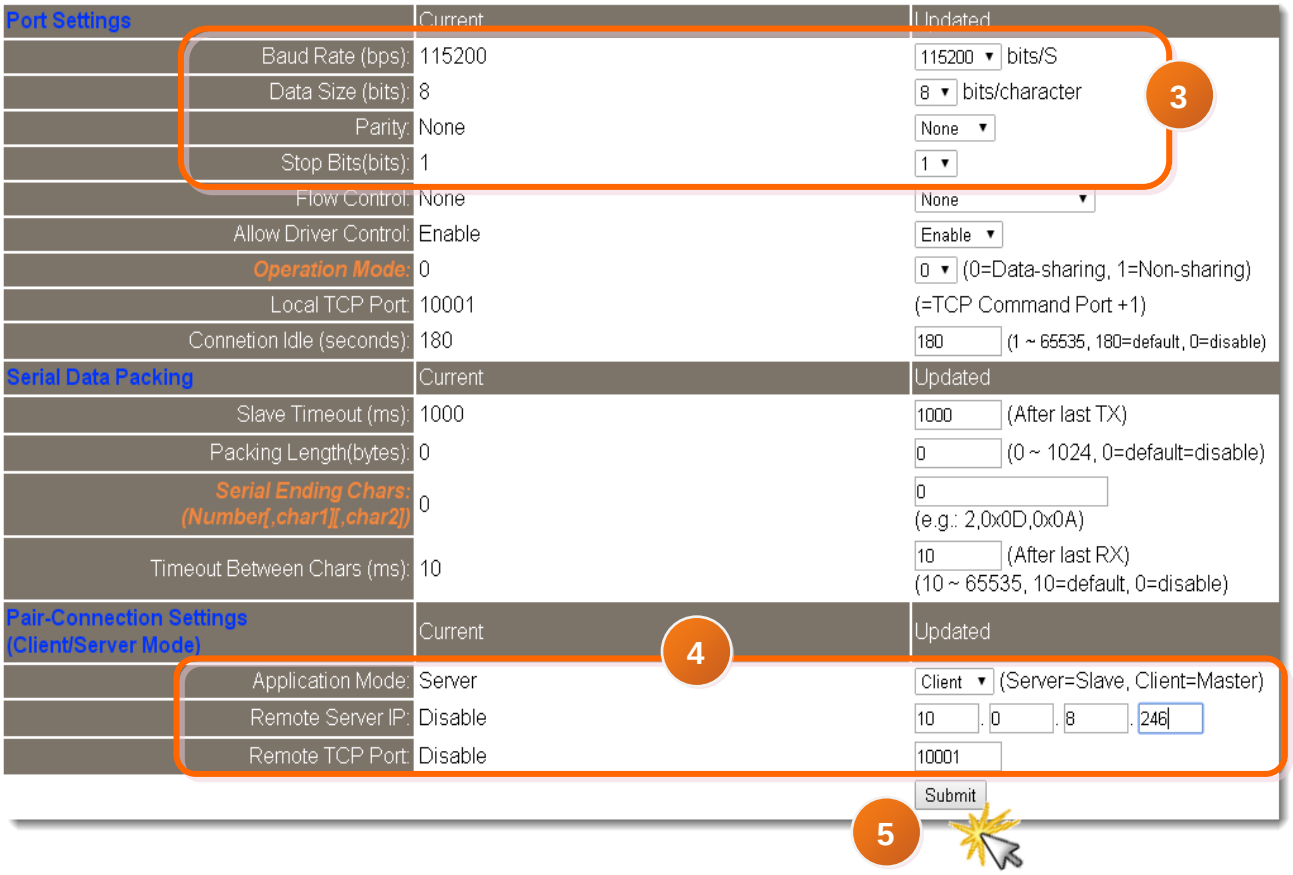
3. Select the appropriate **Baud Rate and Data Format** settings from the relevant drop down options, for example "**115200**" , "**8", "None"** and **1**" .

4. The pair-connection settings area as follows:
   4-1: Select "**Client**" from the "**Application Mode (Server Mode)**" drop down options
   4-2: Type the **IP address of the tDS-700 #2** in the "**Remote Server IP**" field.
   4-3: Assign a **TCP port for the tDS-700 #2** in the "**Remote TCP Port**" field.

5. Click the "**Submit**" button to complete the configuration.



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Step 4: Configuring the Pair-connection (Server Mode) on the Web Server for tDS-700 #2

1. Enter the configuration page for the tDS-700 #2 web server.
2. Click the **"Port1"** link to enter the settings page of the tDS-700 #2.
3. Set the Baud Rate to "**115200"** and the Data Format to "**8, None, 1"**.

(Refer to Figures 5-3 to 5-5 for illustrations of how to perform the above steps.)

4. Select "**Server**" from the "**Application Mode(Server Mode)**" drop down options and then click the "**Submit**" button to complete the configuration.

Figure 5-6

Step 5: Testing the Pair-connection Functions

1. The Test2COM.exe program is located at:

CD:\Napdos\multiport\utility
http://ftp.icpdas.com/pub/cd/iocard/pci/napdos/multiport/utility/

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2. Execute the Test2COM.exe program.

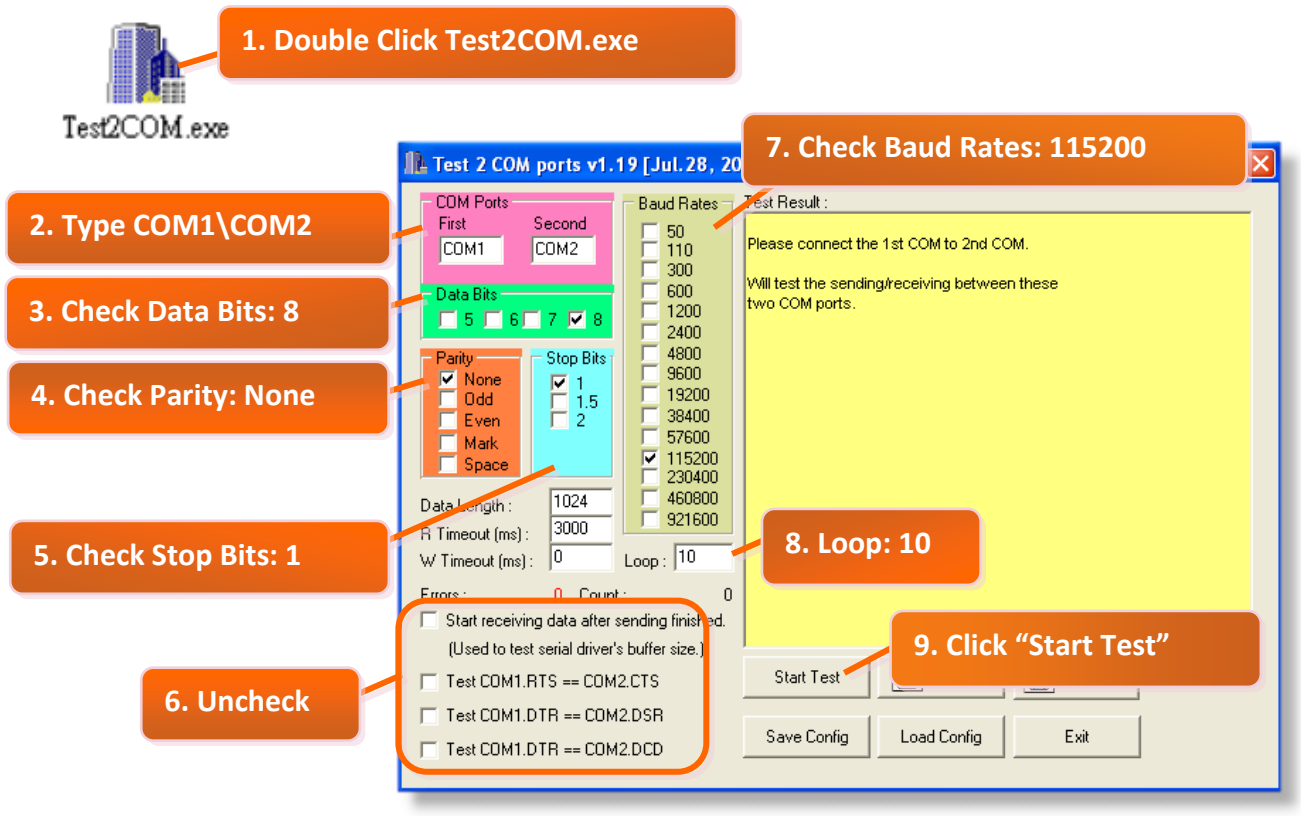

Figure 5-7

Notes: The Baud Rate and data format depend on the serial port settings for the web configuration above.

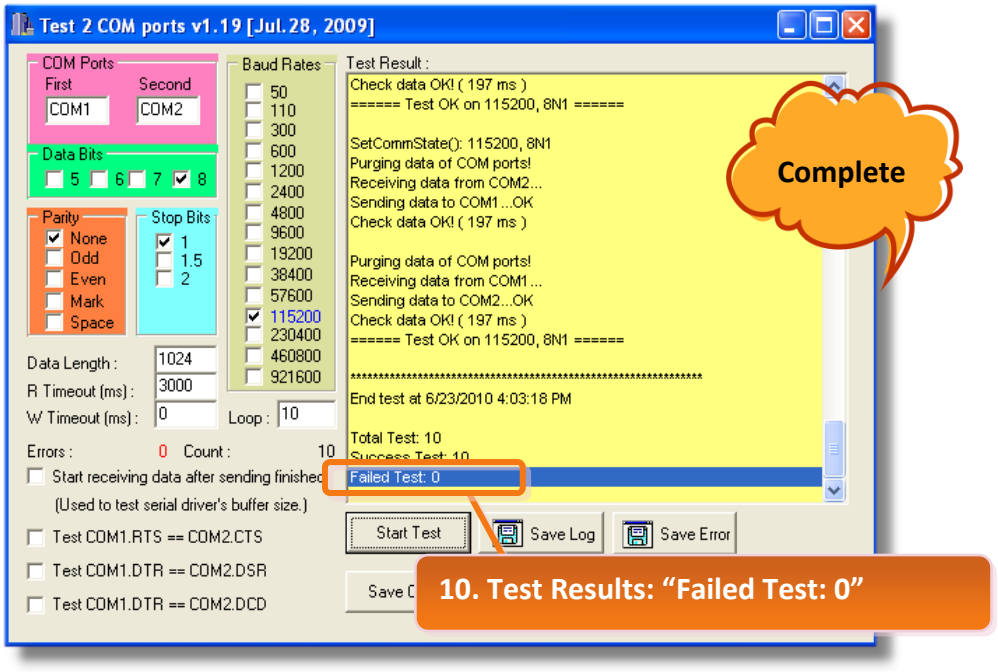
Test 2 COM ports v1.19 [Jul.28, 2009]
Complete
Check data OK! (197 ms)
====== Test OK on 115200, 8N1 ======
SetCommState(): 115200, 8N1
Purging data of COM ports!
Receiving data from COM2...
Sending data to COM1...OK
Check data OK! (197 ms)
Purging data of COM ports!
Receiving data from COM1...
Sending data to COM2...OK
Check data OK! (197 ms)
====== Test OK on 115200, 8N1 ======
End test at 6/23/2010 4:03:18 PM
Total Test: 10
Failed Test: 0
Start Test
Save Log
Save Error
10. Test Results: "Failed Test: 0"

Figure 5-8

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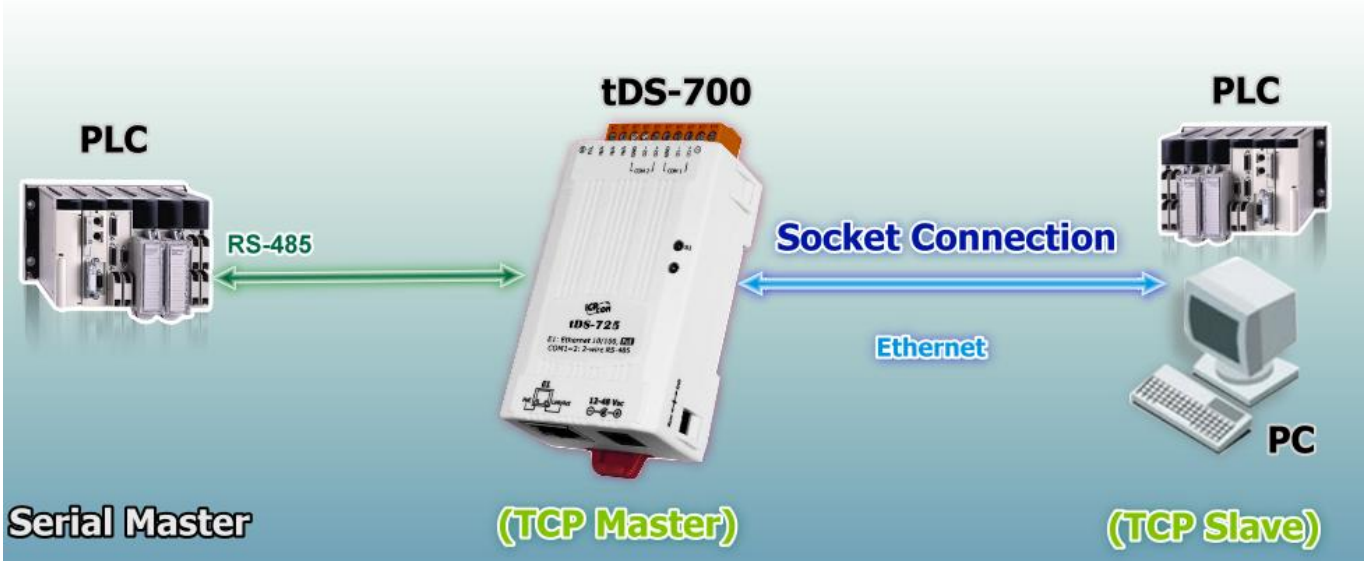
5.5 TCP Client Mode Applications

In TCP Client Mode, the tDS-700 can establish a TCP connection to a specific TCP slave device actively by TCP server program. The whole system should operate like this:



The following are examples of TCP Client Mode tests:

TCP Client Mode Settings:

Model	Port Settings (default)		Pair-connection Settings		
	Baud Rate	Data Format	Application Mode	Remote Server IP	Remote TCP Port
tDS-700	115200	8, N, 1	Client	10.0.8.21	500
				IP address and TCP port for the PC #2 (TCP Server)	
PC #2 (TCP Server)	-	-	-	-	-
PC #1 (Serial Master)	115200	8, N, 1	-	-	-

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Follow the procedure described below:

Step 1: Connecting to a network, a PC and a Power Supply

1. Confirm that the tDS-700 module is functioning correctly. Refer to Chapter 3 Setting up the tDS-700 Module for more details.

2. Connect both the tDS-700, TCP server (PC #2) and hyper terminal (PC #1) to the same sub network or the same Ethernet Switch. For detailed RS-232/RS-422/485 wiring information, refer to section 2.7 "Wiring Notes for RS-232/485/422 Interfaces".

The wiring diagram is as follows:

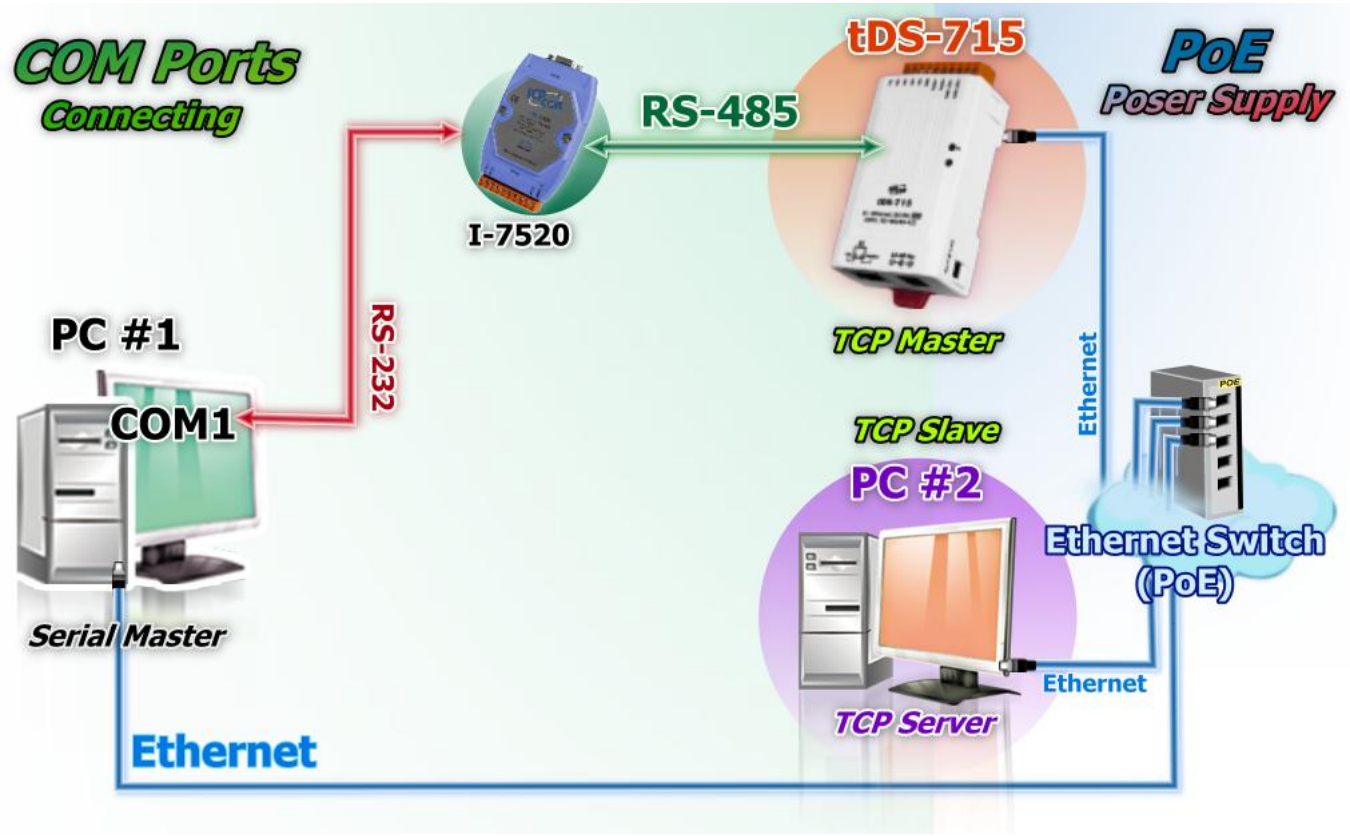

Figure 5-9

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Step 2: Configuring the Ethernet Settings

Contact your Network Administrator to obtain a correct and functioning network configuration (including the **IP Address, Mask and Gateway details)** for the tDS-700 module. Also refer to Chapter 3 Setting up the tDS-700 Module for more details.

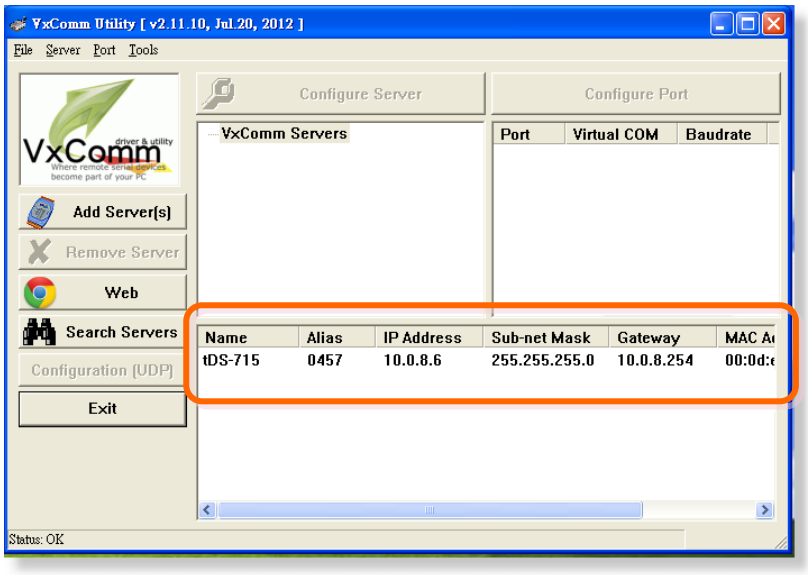

Figure 5-10

Step 3: Configuring Pair-connection (TCP Client Mode) on the Web Server for the tDS-700 module

1. Enter the password (**default: admin**) in the Login password field, and then click the **"Submit"** button to enter the configuration page.

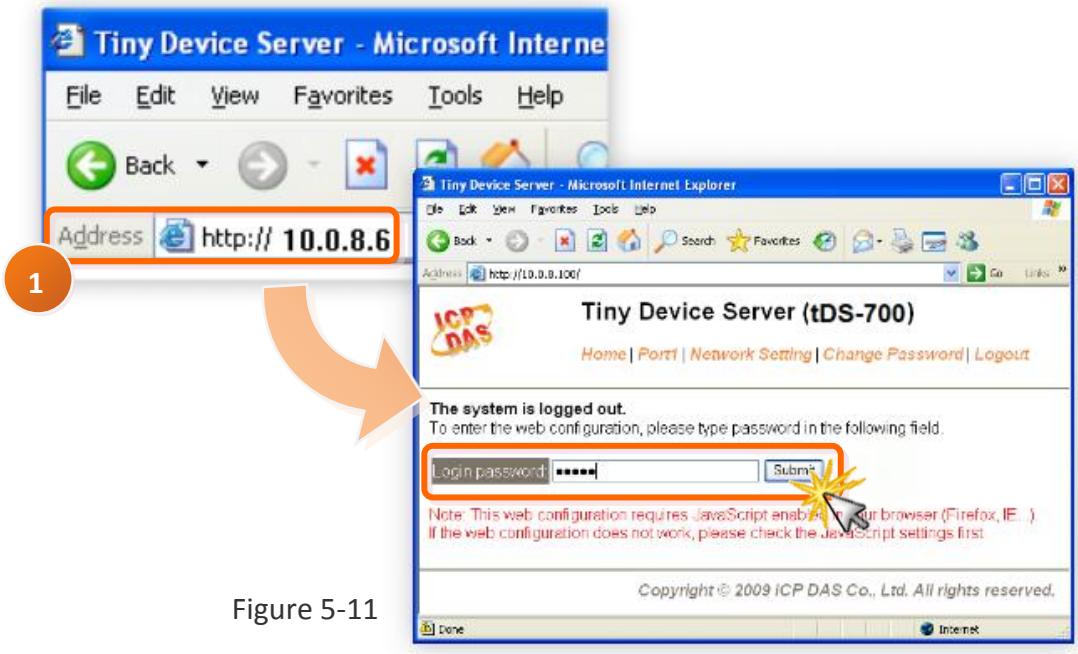
Tiny Device Server - Microsoft Interne
File Edit View Favorites Tools Help
Back
Address http:// 10.0.8.6
1
Tiny Device Server - Microsoft Internet Explorer
Tiny Device Server (tDS-700)
Home | Port1 | Network Setting | Change Password | Logout
The system is logged out.
To enter the web configuration, please type password in the following field.
Login password
Submit
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Figure 5-11

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2. Click the **"Port1"** link to enter the settings page.

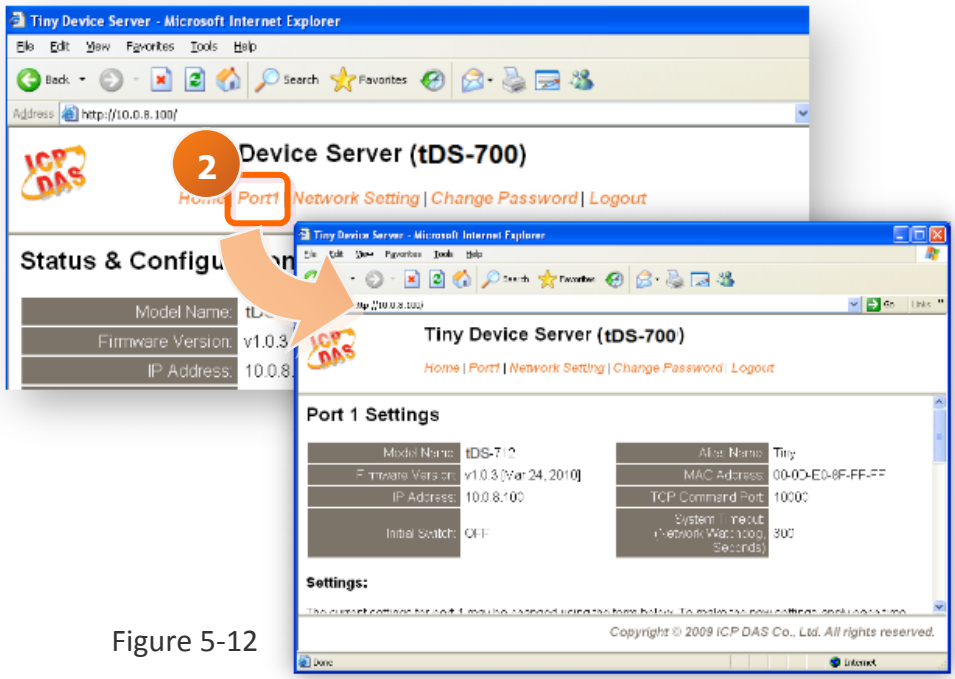

Figure 5-12

3. Select the appropriate **Baud Rate and Data Format** settings from the relevant drop down options, for example "**115200**" , "**8", "None"** and **1**" .

4. The pair-connection settings area as follows:
   4-1: Select "**Client**" from the "**Application Mode(Server Mode)**" drop down options
   4-2: Type the **IP address of the TCP Server (PC #2)** in the "**Remote Server IP**" field.
   4-3: Assign a **TCP port for the TCP Server (PC #2)** in the "**Remote TCP Port**" field.

5. Click the "**Submit**" button to complete the configuration.

※ Refer to Figures 5-13 for an illustration of how to perform the above steps.

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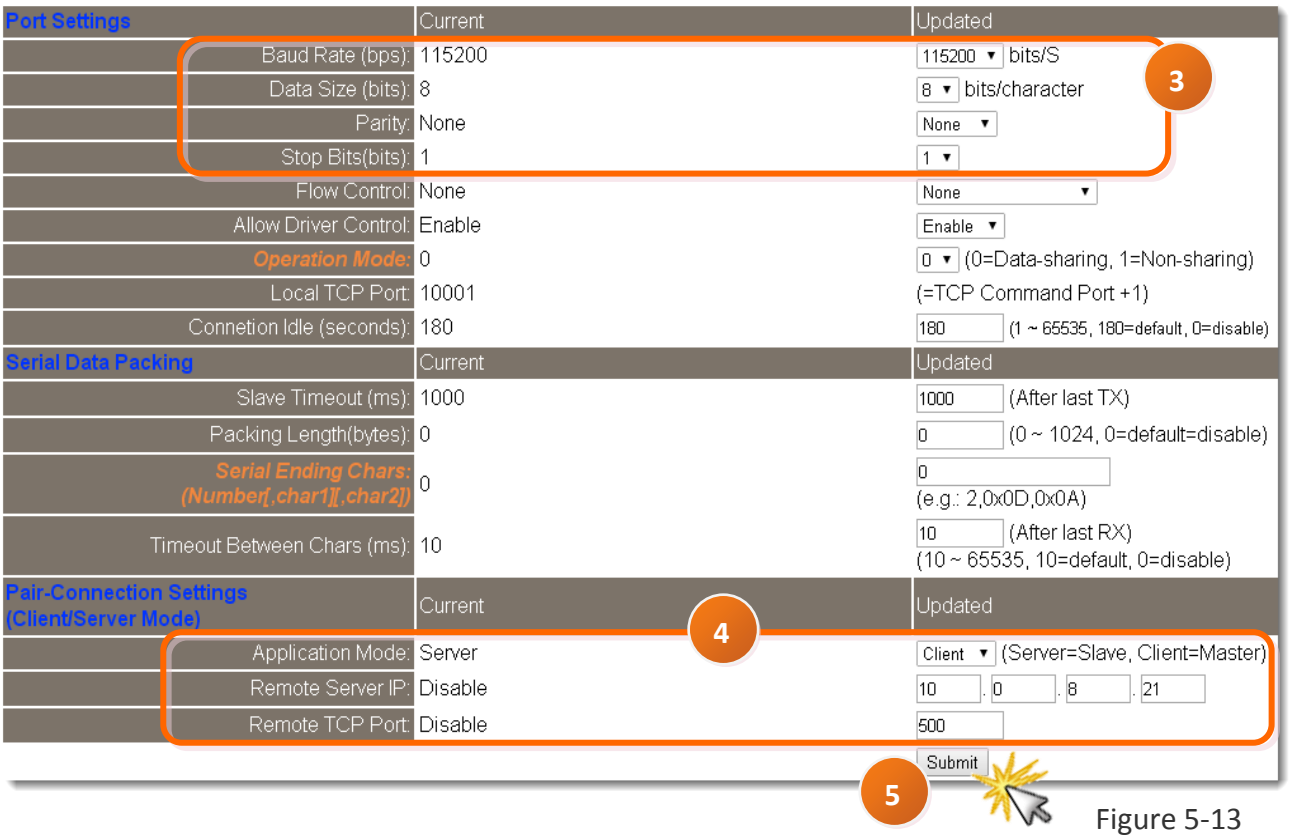
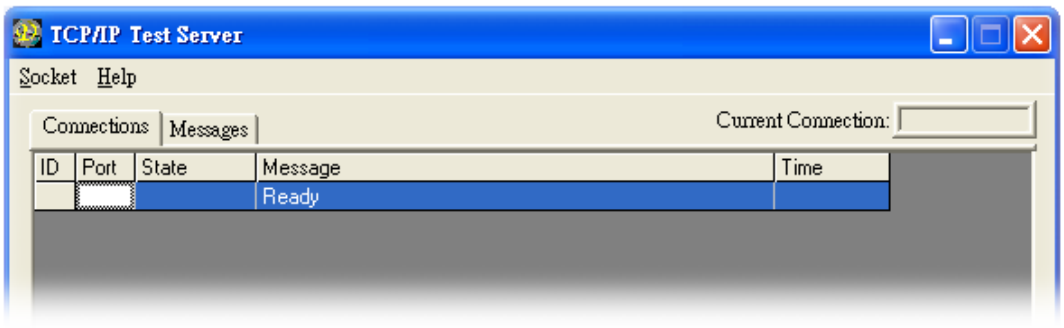


Figure 5-13

Step 4: Testing the Pair-connection (TCP Client Mode) Functions

1. Install TcpIpEcho.exe (TCP/IP Test Server program) on your PC.
   The software is located at:
   http://www.brothersoft.com/tcp-ip-test-server-27898.html

2. Run the TCPIPEcho.exe program.



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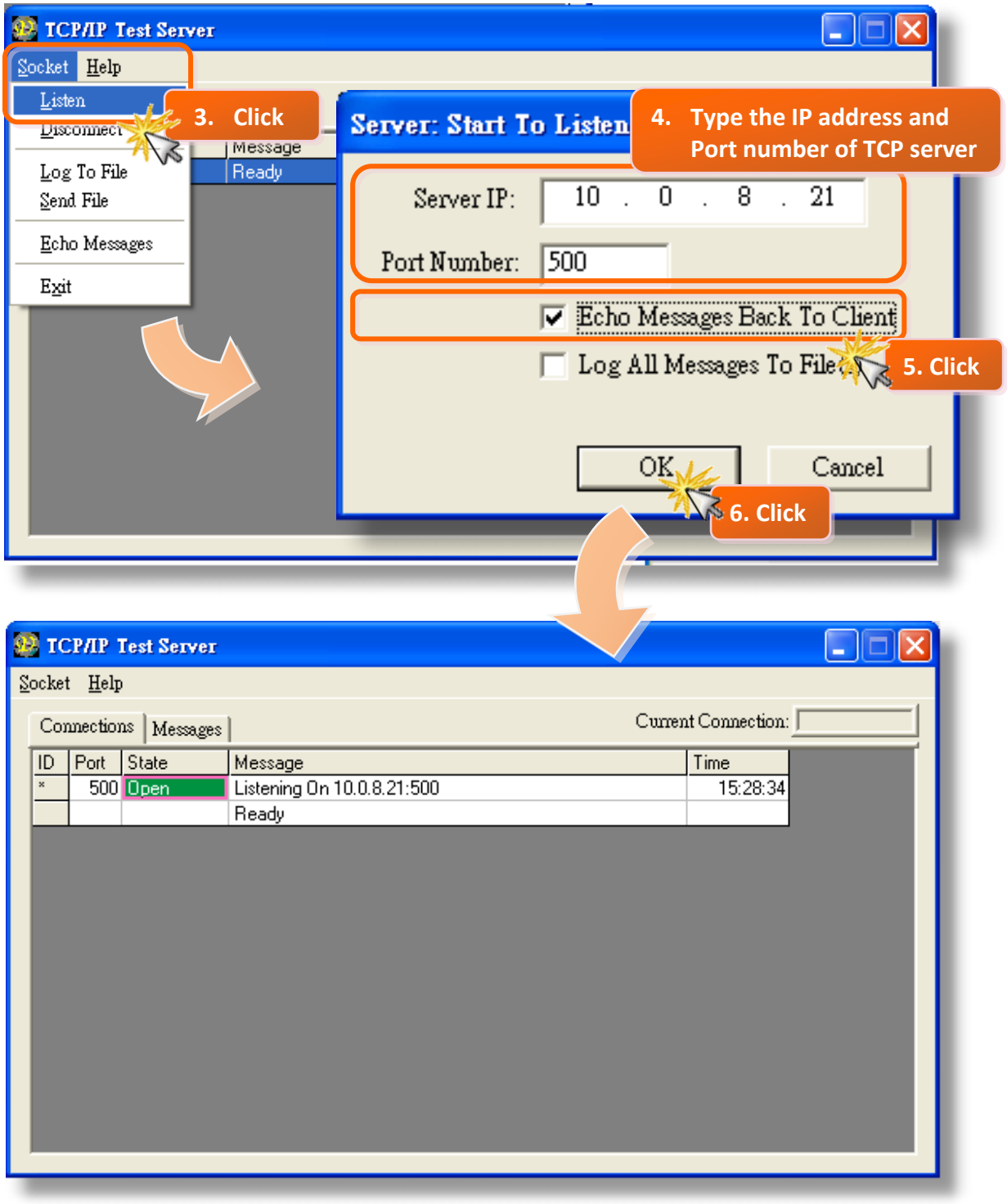
3. Click on **"Socket" → "Listen"**.
4. Type the **IP address** and **port number** of the TCP Server (PC#2) in the "**Server IP**" and "**Port Number**" field (for example "**10.0.8.21" and "500**").
5. Click the **"Echo Messages Back To Client"** check box.
6. After clicking the **"OK"** button, the server will begin listening on the specific IP/Port. This will be indicated an "Open" line in the TCP/IP Test Server dialog box.



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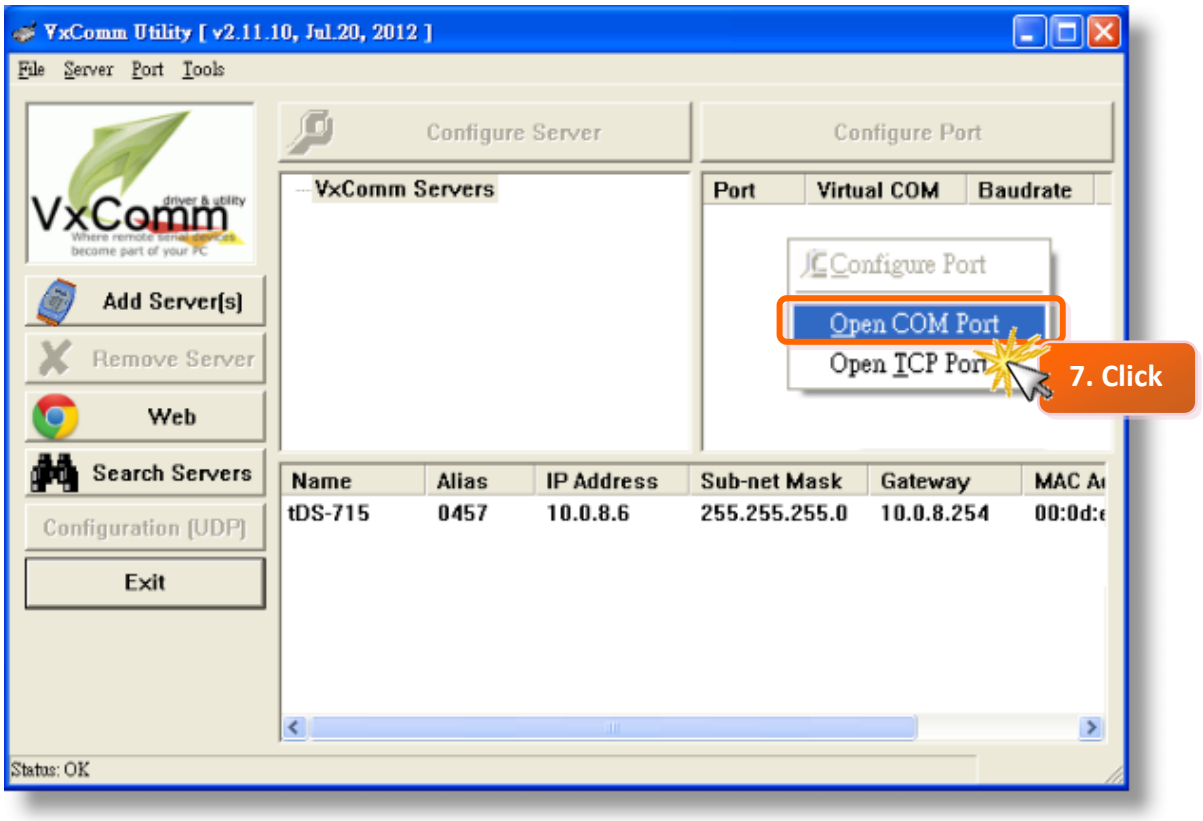
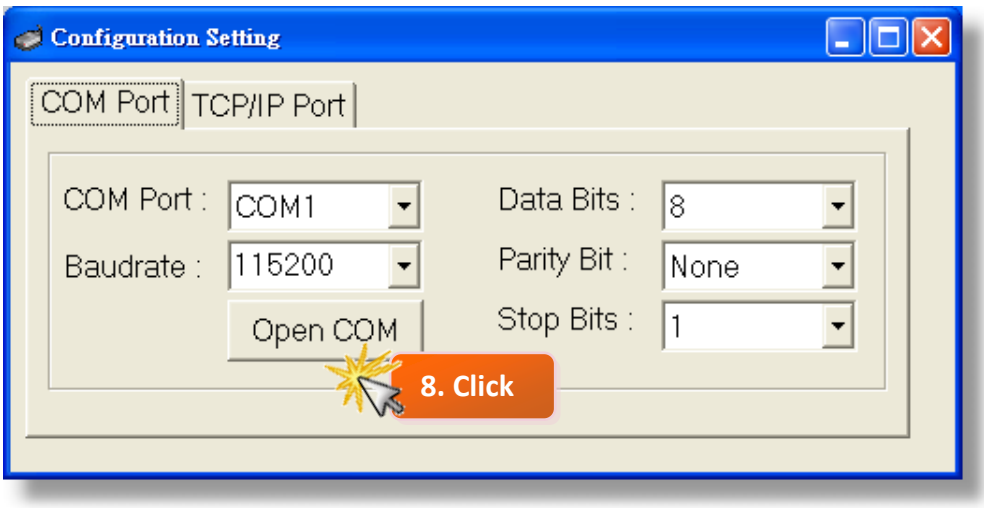
7. Right click in the "**Configure Port**" area and then choose the **"Open COM Port"** item under the VxComm utility.



8. Select the appropriate **COM Port**, **Baud Rate and Data Format** settings from the relevant drop down options (for example "**COM1**", "**115200**" , "**8", "None"** and **1**"), and then click the "**Open COM**" button.



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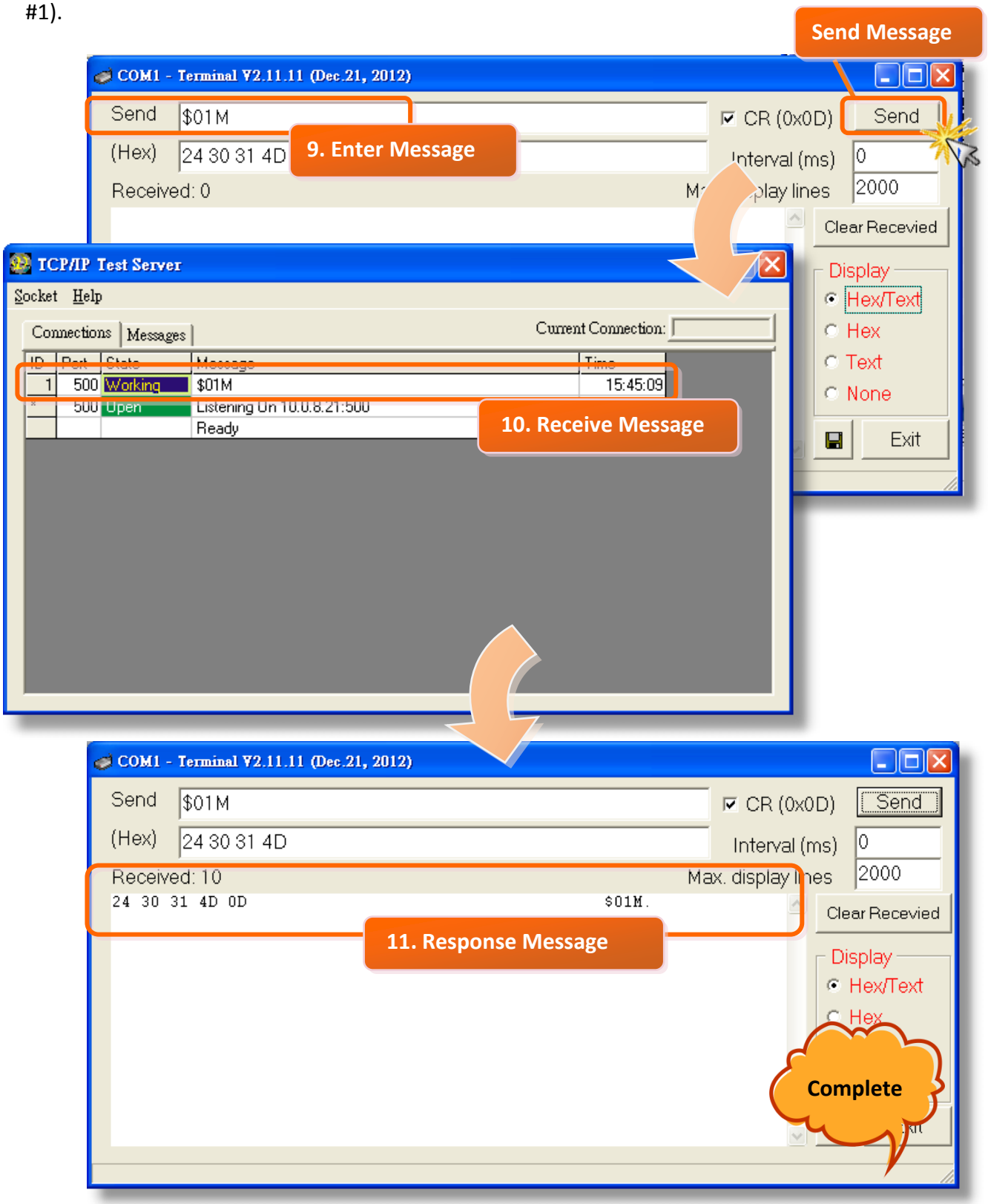
9. Type a string in the send field and then click the "**Send**" button on the COM1 terminal (PC #1).
10. Confirm that TCP server (PC #2) will receive this string under the TCP/IP Test Server.
11. When a response is received, it will be displayed in the received field on the COM1 terminal (PC #1).



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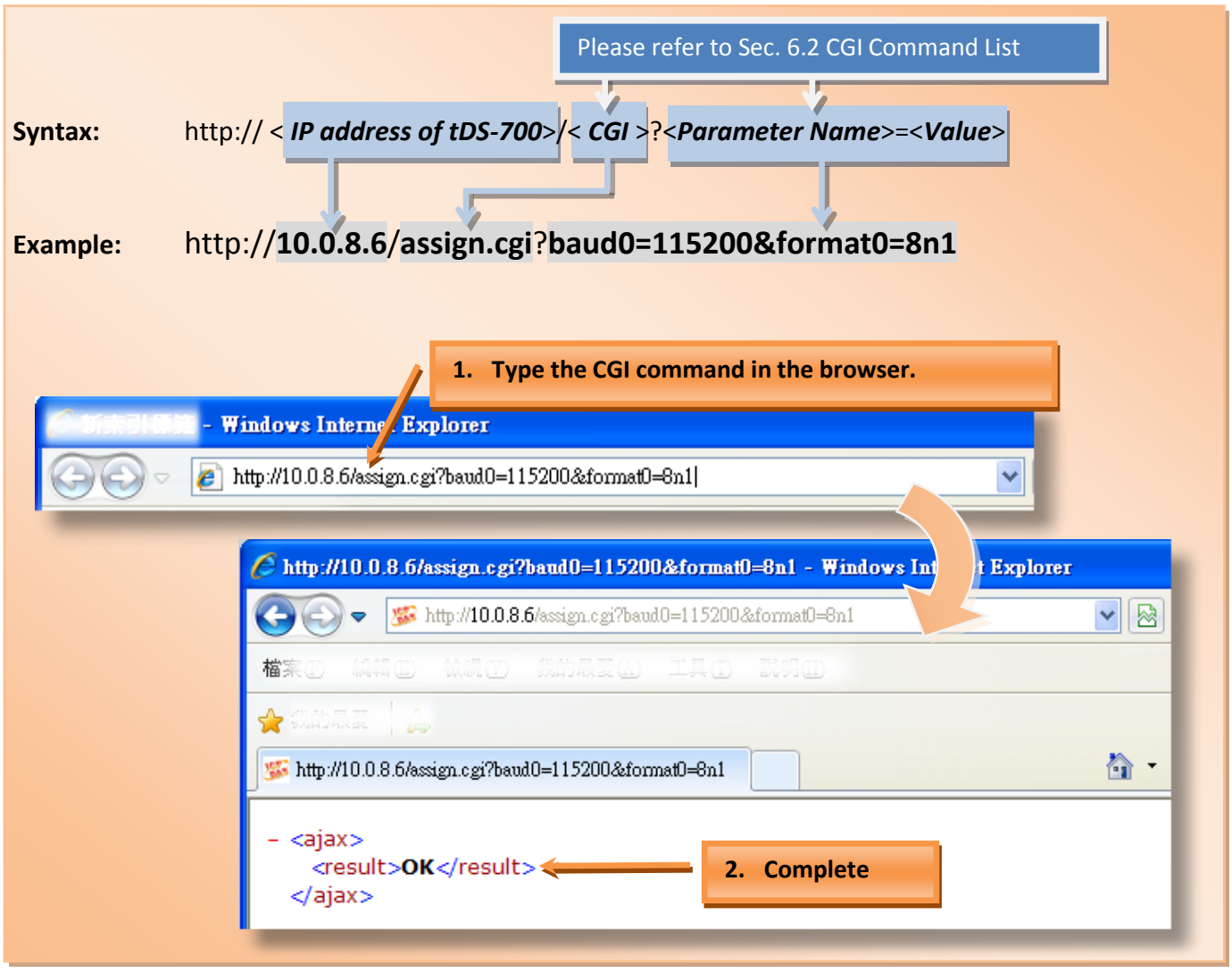
6. CGI Configuration

The tDS-700 series can be configured via convenient URL commands. This section lists the commands in URL format corresponding to the basic functions of tDS-700. Please make sure you have correctly configured the network settings for the tDS-700 before using CGI configuration. (Please refer to Chapter 3 "Setting up the tDS-700 module" about the Ethernet settings.)

6.1 CGI URL Syntax

Type the CGI URL syntax in the browser, as follows:



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6.2 CGI Command List

Network Settings				
No.	**Function Name**	**Parameter Name**	**Value Constraint**	**CGI**
01	Set Address Type	dhcp	0,1 0: Disable; 1: Enable;	assign.cgi
02	Set IP Address	ip	xxx.xxx.xxx.xxx	
03	Set Gateway	gway	xxx.xxx.xxx.xxx	
04	Set Net Mask	mask	xxx.xxx.xxx.xxx	
05	Set TCP Command Port	cmdport	1~65535 Default: 10000	
06	Set Command Port Timeout (Socket Watchdog)	cmdwdt	1~65535 seconds, Default: 30; Disable: 0;	
07	Set MAC Address	mac	Format: FF-FF-FF-FF-FF-FF	
08	Set Alarm IP Address(UDP)	aip	xxx.xxx.xxx.xxx	
09	Set Alarm Port(UDP)	aport	1~65535 seconds, Default: 30; Disable: 0;	

General Configuration Settings				
No.	**Function Name**	**Parameter Name**	**Value Constraint**	**CGI**
01	Set Alias Name	aliname	Max. 18 chars	assign.cgi
02	Set System Timeout	syswdt	30 ~ 65535 seconds, Default: 300; Disable: 0	

Filter Settings				
No.	**Function Name**	**Parameter Name**	**Value Constraint**	**CGI**
01	Add IP to List (white list)	fip0 ~ fip4 fipm0 ~ fipm4 (mask)	xxx.xxx.xxx.xxx	assign.cgi
02	Delete IP#	delfip	0 ~ 4	
03	Delete All	delfip	all	

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Serial Port Settings

No.	Function Name	Parameter Name	Value Constraint	CGI
01	Set Baud Rate	baud0 & baud1	(bits/S)	assign.cgi
02	Set Data Format	format0 & format1	8n1 Data bits: 5 ~ 8; Parity: n, e, o, m, s; Stop bits: 1, 2;	
03	Set Flow Control	flow0 & flow1	0,1 0: None; 1: CTS/RTS	
04	Set Dynamic Serial Setting	dyna0 & dyna1	0,1 0: Disable; 1: Enable	
05	Set Serial Ending Chars	endchr0 & endchr1	Number[,char1][,char2]	
06	Set Operation Mode	opmode0 & opmode1	0,1	
07	Set Slave Timeout	slto0 & slto1	(ms)	
08	Set Data Buffer Delay Time	dbdt0 & dbdt1	(ms)	
09	Set Packing Length	Packlen0 & packlen1	0 ~ 255 bytes	
10	Set TCP Timeout	tto0 & tto1	1~65535 seconds, Default: 180; Disable: 0	

Restore Factory Defaults

No.	Function Name	Parameter Name	Value Constraint	CGI
01	Reboot	-	-	Reboot.cgi
02	Reset To Factory	-	-	Reset.cgi

Queries Setting Status

No.	Function Name	Access Method	Parameter Name	Value Constraint	CGI
01	Get module status.	-	-	-	status.cgi
02	Get the serial port configuration information.	-	-	-	conf_port.cgi
03	Get the network configuration information.	-	-	-	conf_net.cgi

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Appendix A: Glossary

1. ARP (Address Resolution Protocol)

The Address Resolution Protocol (ARP) is a telecommunication protocol that is used to convert an IP address to a physical address, such as an Ethernet address.

Consider two machines A and B that share the same physical network. Each has an assigned IP address IP_A and IP_B, and a MAC address, MAC_A and MAC_B. The goal is to devise a low-level software application that hides the MAC addresses and allows higher-level programs to work only with the IP addresses. Ultimately, however, communication must be carried out by the physical networks using whatever MAC address scheme the hardware supplies.

Suppose machine A wants to send a packet to machine B across a physical network to which they are both attached, but A only has the Internet address for B, IP_B. The question arises: how does A map that address to the MAC address for B, MAC_B?

ARP provides a method of dynamically mapping 32-bit IP address to the corresponding 48-bit MAC address. The term dynamic is used since the mapping is performed automatically and is normally not a concern for either the application user or the system administrator.

2. Clients and Servers

The client-server paradigm uses the direction of initiation to categorize whether a program is a client or server. In general, an application that initiates peer-to-peer communication is called a client. End users usually invoke client programs when they use network services.

By comparison, a server is any program that waits for incoming requests from a client program. The server receives a request from a client, performs the necessary actions and returns the result to the client.

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3. Ethernet

The term Ethernet generally refers to a standard published in 1982 by Digital Equipment Corp., Intel Corp. and Xerox Corp. Ethernet is the most popular physical layer Local Area Network (LAN) technology in use today.

4. Firmware

Firmware is an embedded software program or set of instructions programmed on a device that provides the necessary instructions for how the device communicated with other computer hardware, and is located or stored in a semi-permanent storage area, e.g., ROM, EEPROM, or Flash memory. Firmware can often be updated by downloading a file from the manufacturer's web site or FTP.

5. Gateway

Computers that interconnect two networks and pass packets from one to the other are called Internet Gateways or Internet Routers. Gateways route packets that are based on the destination network, rather than the destination host.

6. ICMP (Internet Control Message Protocol)

ICMP provides a method of communicating between the Internet Protocol software on one machine and the corresponding software on another. It allows a gateway to send error or control messages to other gateways, or allows a host to diagnose problems with the network communication.

7. Internet

Physically, the Internet is a collection of packet switching networks interconnected by gateways that together with the TCP/IP protocol, allows them to perform logically as a single, large and virtual network. The Internet recognizes hosts using 32-bit IP address.

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8. IP (Internet Protocol) Address

Each interface on the Internet must have a unique IP address (also called an Internet address). These addresses are 32-bit numbers, and are normally written as four decimal numbers, one for each byte of the address for example “192.168.41.1”. This is called dotted-decimal notation.

9. MAC (Media Access Control) Address

To allow a computer to determine which packets are meant for it, each device attached to an Ethernet network is assigned a 48-bit integer known as its MAC address (also called the Ethernet address, the hardware address or the physical address). A MAC address is normally written as eight hexadecimal numbers, for example “**00:71:88:af:12:3e:0f:01**”. Ethernet hardware manufacturers purchase blocks of MAC addresses and assign them in sequence as they manufacture Ethernet interface hardware. Thus, no two hardware interfaces can have the same MAC address.

10. Packet

A packet is the unit of data sent across a physical network. It consists of a series of bits containing data and control information, including the source and the destination node (host) address, and is formatted for transmission from one node to another.

11. Ping

Ping is a network administration utility used to test the whether a host on an Internet network is active, and to measure the round-trip time for messages sent from the originating host to a destination computer. Ping operates by sending an ICMP echo request message to a host, expecting an ICMP echo reply to be returned. Normally, if a host cannot be pinged, Telnet or FTP cannot be used to connect to the host. Conversely, if Telnet or FTP cannot be used to connect to a host, Ping is often the starting point to determine the nature of the problem.

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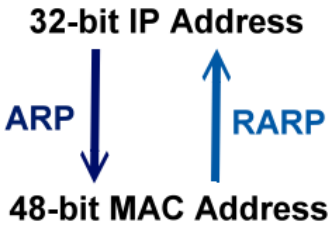
12. RARP (Reverse Address Resolution Protocol)

RARP provides a method of dynamically mapping 48-bit MAC address to the corresponding 32-bit IP address. RARP has now been replaced by the Bootstrap Protocol (BOOTP) and the modern Dynamic Host Configuration Protocol (DHCP).



13. Socket

Each TCP segment contains a source and destination port number that can be used to identify the sending and receiving application. These two values, along with the source and destination IP addresses in the IP header, uniquely identify each connection. The combination of an IP address and a port number is called a socket.

14. Subnet Mask

A Subnet mask, often simply called the “Mask”, is a 32-bit number that masks and IP address, and divides the IP address into the network address and the host address. Given its own IP address and its subnet mask, a host can determine whether a TCP/IP packet is destined for a host that is (1) on its own subnet, or (2) on a different network. If (1), the packet will be delivered directly; otherwise it, will be delivered via a gateway or a router.

15. TCP (Transmission Control Protocol)

TCP is a set of rules used in combination with the Internet Protocol to send data in the form of message units between computers over the Internet. TCP provides a reliable flow of data between two hosts and is associated with tasks such as dividing the data passed to it from an application into appropriately sized chunks for the network layer below, acknowledging received packets, setting timeouts to make certain that the other end acknowledges packets that are sent, and so on.

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16. TCP/IP

The Transmission Control Protocol (TCP) and the Internet Protocol (IP) are standard network protocols that are almost always implemented and used together in a formation is known as TCP/IP. TCP/IP can be used to communicate across any set of interconnected networks.

17. UDP (User Datagram Protocol)

UDP is an internet protocol that provides a much simpler service to the application layer as it only sends packets of data from one host to an other, but there is no guarantee that the packets will reach the destination host. UDP is suitable for purposes where error checking and correction is either not necessary or is performed in the application.

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Appendix B: Actual Baud Rate Measurement

Ideal Baud Rate (bps)	Actual Baud Rate (bps)	Error
50	50	0.00%
110	109.92	0.07%
300	298.48	0.51%
600	597.04	0.49%
1200	1197.6	0.20%
2400	2395.2	0.20%
4800	4790.4	0.20%
9600	9568.0	0.33%
14400	14392	0.05%
19200	19136	0.33%
38400	38464	0.17%
57600	57552	0.08%
115200	114960	0.21%
128000	128240	0.18%
230400	229920	0.21%
250000	250000	0.00%
256000	256400	0.15%
460800	459760	0.22%
921600	921600	0.00%

Note: Recommended max baud rate is 115200 bps or below.
Because the loading of the module, we don't guarantee a proper operation if using a larger baud rate (over 115200 bps).

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